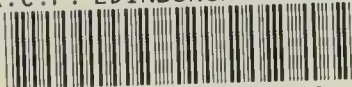


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OBSTETRIC ACCIDENTS, EMERGENCIES, AND OPERATIONS

BY

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TO THE
PRACTITIONERS AND MEDICAL STUDENTS
OF AMERICA

THIS BOOK IS CORDIALLY DEDICATED.

• THE AUTHOR.

P R E F A C E.

THIS book is not a treatise on midwifery nor a manual of obstetrics, of which there are excellent ones already written. It is intended for the use of the practitioner who when away from home has not the opportunity of consulting a library or of calling a friend in consultation. He is then thrown upon his own resources, and will find this book of benefit in guiding and assisting him in emergencies. Frequent references are made to French authorities, because the art and science of midwifery originated in France, where they still hold a pre-eminent rank. References are also made to cases occurring in the author's hospital and private practice extending over a period of forty years.

The author desires to acknowledge his obligation to Dr. Joseph Grindon, whose aid has been most valuable in preparing this work for publication.

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OBSTETRIC ACCIDENTS, EMERGEN- CIES, AND OPERATIONS.

PART I. ACCIDENTS TO THE WOMAN.

CHAPTER I.

ABORTION.

OF all the accidents which can befall the pregnant woman, abortion is the commonest. It has therefore been thought proper in this book to treat of it first, giving succinct views as to its symptoms and short rules for its treatment for the guidance of practitioners, who will certainly often be called upon to treat these cases.

Definition.—Abortion is the delivery of the child before it has reached the period of viability—that is, under seven months of pregnancy. After this period and until the end of pregnancy this accident is usually called “miscarriage” or premature labor.

Abortion is a very serious misfortune. Besides the loss of the life of the child, the life of the mother is often in great danger; moreover, the accident is frequently followed by serious pathological consequences. Often a woman dates her bad health from that event,

and as a consequence she falls into the hands of the gynecologist for sometimes a very protracted course of treatment. Furthermore, abortion is not unfrequently followed by sterility for the remainder of the woman's life, or the woman acquires a habit of repeated abortion.

Frequency of Abortion.—Whitehead's reliable statistics prove that 37 per cent. of women under thirty years of age abort, and show that out of 2000 women who applied at the lying-in hospital at Manchester (England), the collective abortions numbered 1222. Meadows says that 1 woman in every 5.2 of pregnant women aborts. Bush and Moser state that 1 woman in 5 aborts. Abortions are known to have occurred ten times or oftener with the same woman. What a loss for humanity!

The more advanced is pregnancy, the less liable is it to be interrupted by abortion. The greater number of abortions take place in the second, third, and fourth months of pregnancy. On account of the increased activity of the vascular system of the ovum and of that of the internal surface of the uterus, hyperemia takes place especially at the dangerous period of the third month.

The placenta under three months is not fully developed. The delicate vessels of the chorion and of its villousities constitute until then the only intermediary between the ovum and the decidua, while later the placenta establishes a more perfect communication.

Abortion often takes place at the period when menstruation would have appeared if the woman had not been pregnant, for this is the time when a periodic congestion of the uterus exists even in pregnancy. Hence the pregnant woman at these periods should be cautioned to be very careful in her mode of life—keeping

quiet, avoiding violent exercise and all the causes tending to provoke uterine congestion—being especially careful should she have had one or several abortions. There is good reason to believe that such accidents during the first months of pregnancy are far more frequent than is generally supposed, many abortions doubtless passing away in the form of a supposed menstruation only a little delayed. It is the general experience of practitioners that women in the highest and middle walks of life abort more frequently than do those in the lower classes, provided the latter are not subjected to the baneful influences of malaria and positive hardships. This certainly is true of American females (W. Coles).

Abortions are sometimes epidemic and happen at certain epochs, depending upon peculiar atmospheric or telluric influences—temperature and barometric and electrical conditions of the atmosphere. This fact has been noticed by many good observers.

Causes of Abortion.—Some causes are *predisposing*, such as excessive sensitiveness, debility, or general and local hyperemia of the uterus. The latter is occasionally the cause that destroys the connection of the ovum with the uterus, and, as a consequence, a hemorrhage is produced which soon causes a complete detachment and expulsion of the ovum.

When there is a great disposition to abort, a trifling cause may occasion the accident; for example, a false step, tripping on the carpet, or raising a weight from the ground. If that disposition is not marked, it often requires powerful and even violent causes to produce it. In the author's experience was the case of a young woman, three months pregnant, who jumped seven times

from the top of a piano, and then rolled, barrel-like, down a long flight of stairs, without producing any effect. She took also the strongest known emmenagogues, but failed, and in time was confined of a healthy boy. Meissner relates the instance of a woman, seven months pregnant, who, in order to escape a fire in the house, tied sheets together and endeavored to let herself down from an upper window. The rope of sheets was too short, and she fell from the level of the third story on a pile of stones and broke her arm, but she did not miscarry. Carus relates several similar cases.

Hyperemia of the utero-placental vessels is produced by vivid mental impressions, febrile diseases, fatiguing walks, abusive use of the corset and of the sewing-machine, bicycle-riding—the latter being also a cause of uterine displacements—riding on horseback or in carriages over rough roads, excessive sexual indulgence, and frequent constipation. Among other causes are a *pathological condition of the fetus and its death*, or what Stoltz calls “internal abortion;” hot and cold douches and injections; tamponing the vagina; the use of sponge or laminaria tents in the cervical canal; and oxytocics, such as ergot, cinnamon, and borax. It is to be noted here that quinin, when given for malarial fevers, does not produce abortion, this being the opinion and experience of practitioners in the Southern States. Extensive laceration and deep ulceration of the cervix will often cause abortion unless repaired or healed; also painful extraction of teeth. However, if the toothache is so violent as to deprive the woman of sleep, it were better to have the tooth extracted, as this is less dangerous than is the great irritability and the insomnia

caused by the intense suffering of a "jumping" toothache. The patient should not be given nitrous-oxide gas nor chloroform.

Another frequent cause of abortion is *retroversion* and *retroflexion*, producing incarceration of the body of the uterus, unless properly replaced and kept in position by a well-fitted pessary until the fifth month, when the danger no longer exists.

Uncontrollable vomiting often causes abortion under four months. For further details on this interesting and important subject the reader is referred to the special chapter on *Uncontrollable or Pernicious Vomiting of Pregnancy*.

A frequent cause of abortion is *excessive pruritus of the vulva*, which condition should be relieved by lead-and-opium lotions or by applications of pure dry calomel. Another cause is *urticaria*, commonly called "nettle-rash," which is sometimes so severe and so general as to make the woman frantic, causing fever and consequent abortion. If not relieved by the usual remedies, resort should be had to venesection, the most cooling of all remedies, and the only one which succeeded with the writer in an aggravated case of *urticaria*.

Causes on the part of the mother are serious *febrile diseases*, such as pneumonia, dysentery, small-pox, measles, scarlatina, eclampsia, etc.; also grave chorea and epilepsy.

Syphilis on the part of the father or of the mother, or of both, is the principal cause of the death of the fetus, by producing abortion and premature labor, usually between the sixth and the seventh month, constituting a condition known as *habitual death of the fetus*, and happening several times with the same woman. This is to be prevented by early and persistent antisiphilitic treatment, which on

several occasions has secured the birth of healthy children from syphilitic parents.

Causes on the Part of the Ovum.—The diseases originating in the ovum which may eventuate in abortion are—alterations of the villousities of the chorion, fibrinous or fatty changes in the placenta, an abnormal implantation of the placenta on or near the os, hydorrhea, and shortness of the cord, the latter causing an obstruction to the circulation of the cord and placenta, arresting thereby the placental respiration. Parenthetically, it should be noted that one of the most remarkable phenomena connected with the pathology of the fetus is the repeated discovery of worms, such as *ascarides* and *tenia*, in its intestinal canal (Leishman). The question is, How did they get there?

Precursory Symptoms of Abortion.—Occasionally the ovum will suddenly be expelled without any preceding symptom; but generally, for a few days, the woman shows signs of uterine congestion—repeated chilly sensations, a feeling of weight in the lower part of the abdomen, rectal tenesmus, frequent desire to urinate, severe pains in the back, some oozing of blood, and slight uterine contractions. All these symptoms, however, can be corrected by appropriate treatment. If not relieved, the contractions increase, hemorrhage appears, and the ovum, if only one or two months old, is often expelled entire (Hegar). In this case the hemorrhage precedes the contractions, the ovum having been detached by a hemorrhagic effusion between the membranes and the uterus.

When the ovum is dead a moderate flow of dark blood will precede the contractions. The ovum will be felt in the os, from which it will be expelled into the

vagina without any serious danger to the mother. If the ovum be living, there are alternations of contractions and hemorrhages that may last several days, with much pain, and sometimes with very great danger to the woman, on account of the prolongation of the hemorrhages, until the placenta is expelled. No interference with the placenta is then proper, because a part of it might be torn off and retained, causing a new danger of hemorrhage and sepsis.

Diagnosis of Abortion.—In making the diagnosis the questions to be determined are—first, is the woman pregnant? And second, is it an abortion, and, if so, is it inevitable? Is the abortion only begun, and if completed does the uterus still contain remnants of the placenta, membranes, or decidua?

Is the woman pregnant? This fact is easily recognized if the pregnancy is advanced to the fourth month. During the first three months there are only signs of probability, the so-called “rational” signs. An important sign is a suppression of menstruation, without morbid causes, in a previously well-regulated woman in good health. Pajot states that this fact alone would almost certainly prove pregnancy. If, in addition to this condition, there exists in a primipara enlargement of the breasts, the formation of the areola, and the appearance of Montgomery’s tubercles, with nausea and frequent micturition, there is then the greatest probability that the woman is pregnant.

If, under these conditions, there occur persistent hypogastric pains, with short exacerbations, and if at the same time there should be an abundant, persistent flow of blood, with clots, the cervix having become soft and the os dilated, one may be almost certain of being in the presence of an abortion (Charpentier).

Doubts will sometimes exist if the soiled linen or the expelled blood-clots have not been preserved for inspection; hence the necessity of their being preserved for the physician's examination, which will save much hesitation.

Another cause for doubt arises when a woman presents habitually great irregularities in her menstruation. In women with this disposition the menstruation may be suppressed for two or three weeks; there is enlargement of the breasts, yet such women may not be pregnant, although they may believe they are. If at the end of the above-named period a bloody discharge reappears, is it simply a return of menstruation or an abortion?

This suppression may suggest a tubal pregnancy, especially if casts of the uterus and decidua be expelled. Sudden violent pains in the abdomen and rapid serious collapse, with other symptoms of internal hemorrhage, leave no doubt that this irregularity is due to a tubal pregnancy, the tube having ruptured.

These cases have been mistaken for abortions—a mistake generally fatal to the woman unless prompt laparotomy and rapid ligation of the ruptured tube be performed.

There is another class of women who, during the two or three months of their pregnancy, present slight bloody discharges which last for some time, but which differ from true menstruation by not appearing at an habitual menstrual period, and by their lesser quantity and shorter duration. These cases also present perplexing questions.

Some women have a monthly flow during the whole of their pregnancy. This anomaly, though rare, is well authenticated by careful observers.

But the woman may be pregnant, and this suppression, without pain and with concurrent hemorrhages, constitutes what Schroeder and Matthews Duncan call

Missed abortions, in which, after three or four months, the suppression is followed by very irregular and painless hemorrhages. The uterus, however, does not enlarge and the symptoms about the breast disappear. These hemorrhages, which occur usually at first very slightly, are intermittent, the intervals between the losses being days or weeks, or it may be that there is a constant blood-stained discharge, which finally ceases without anything being expelled from the uterus. Then the bleeding ceases for a period of from three to ten months, after which there is a slight return of pain and hemorrhage, when the uterus expels a fetus, several months dead, and perhaps in a parchment-like or a mummified condition. These cases are not uncommon. They are not, however, dangerous for the woman. The duty of the obstetrician is then a masterly inactivity. These facts are interesting, sometimes also extremely important.

According to Madame Lachapelle, in abortion the hemorrhage precedes and accompanies the pains, and increases with their intensity. This hemorrhage is always composed of liquid blood and clots. In painful menstruation (dysmenorrhea) the uterine contractions always precede the hemorrhage, and diminish as the hemorrhage increases. In abortion the clots are in greater abundance and the os is open and soft, while in dysmenorrhea the os is firm and closed. The clots coming from an empty uterus, it is said, are triangular, while in abortion they have no particular shape.

If the clot is still in the neck of the uterus, its structure is fibrinous, says Hill; it does not during a pain become tense, smoother, and protruding. If the ovum be in the neck, it will become tense and rounded, not like a conical clot. The uterus is easily movable if a clot

occupy the neck ; immovable if an ovum. In the latter condition a noticeable change takes place in the form of the neck of the uterus, showing the disappearance of the rather acute angle formerly existing between the neck and the body of the uterus. The neck is then pyriform (Cazeaux). This change in the form of the neck almost always shows that the abortion is inevitable.

The abortion has begun. Is it inevitable, or can it yet be checked? It may be said, in a general way, that so long as the ovum is not dead and the membranes unruptured the abortion may yet be arrested, however great the contractions, the duration of the bloody flow, the modification of shape of the neck, and its dilatation and softness. It has been observed in some rare cases that all these accidents have disappeared under appropriate treatment, and the pregnancy has continued its course (Charpentier).

Is the abortion completed? This question is a very difficult one to answer if great care has not been taken to preserve for the inspection of the physician all clots and discharges, among which the fetus may often be contained. Then there exists the possibility of a twin pregnancy, one ovum having been discharged, the other retained. It will, however, be almost impossible for the second ovum to be retained alive long after such a commotion in the uterus, and within a period of time more or less prolonged there will be a second abortion, which will clear all doubts.

Prognosis of Abortion.—The prognosis is always fatal to the child when born before the age of viability. As to the woman, if her life is seldom seriously compromised, her future health is often gravely affected, espe-

cially on account of the retention of the placenta wholly or in part, or of some of the membranes. There may also remain, moreover, subinvolution, endometritis, or displacements of the uterus or menorrhagia, for which the patient has to place herself in the hands of a gynecologist during perhaps many months.

It is remarked by Schroeder that in abortion and premature births the pelvic extremities of the child present quite frequently—in 40 per cent. of the cases observed by him.

Hemorrhage.—The seriousness of hemorrhage depends upon the length of time occupied in the accomplishment of the abortion. It is in abortion occurring between the second and the third month that are noticed those frightful losses of blood causing syncope, the extinction of the radial pulse, coldness of the extremities, etc. The hemorrhage at that period is caused by the slowness with which the ovum becomes detached from the uterus. It is what Charpentier calls the *avortement en deux temps* (an abortion in two acts); that is, the os closing after the expulsion of the fetus, another labor is required for the expulsion of the rest of the ovum. This expulsion may last several weeks, during which the woman is losing more or less blood.

It is a remarkable fact that women very seldom die of the hemorrhages of abortion, but it may take them a very long time to recuperate. It is also noticed that women can stand loss of blood much better than men. Women for thirty years of their lives lose every month from 6 to 8 ounces of blood, to their great relief.

Treatment of Abortion.—*Preventive Treatment.*—In chloro-anemic patients preparations of bark, iron, iodine, and arsenic are indicated. When syphilis is ascertained

to be the cause of repeated abortions or of premature labors, the woman should enter upon a prolonged course of antisyphilitic remedies, begun early and continued with short intervals of rest, several months if necessary. This treatment has succeeded several times in securing the birth of healthy children at term.

The most successful preparation is a combination of $\frac{1}{16}$ grain of bichlorid of mercury with 8 grains of iodid of potassium in a bitter mixture administered three times a day.

If, notwithstanding rest, avoiding completely all violent exercise, and leading for a while a "horizontal" life, there should appear slight contractions, pain in the back, and a feeling of weight in the abdomen, *viburnum prunifolium* should be used. This remedy has, in the hands of Jenks, who first introduced it, and of Lusk and others, sometimes proved efficacious in preventing abortions. Two-grain pills of *asafetida* several times a day have been successfully used. If this drug fails, the use of the most reliable preparations of opium should be begun, either by the mouth or the rectum. Among these preparations are enemata consisting of a half teaspoonful of laudanum in a small quantity of starch-water, these injections being retained; or suppositories of $\frac{1}{4}$ grain of extract of belladonna and $\frac{1}{2}$ grain of muriate of morphia and cacao-butter, inserted in the rectum every six hours, and preceded daily by a large enema composed of glycerin (4 ounces) and flaxseed tea (1 pint).

It is to be remarked, says Charpentier, how well pregnant women stand large doses of opium. They doubtless have a tolerance for this drug. He has frequently given by the mouth from 40 to 100 drops of laudanum in sev-

eral doses during the twenty-four hours without causing narcotism.

If, notwithstanding this course and after the laudanum injections, the contractions increase, the woman being nervously excited, she should receive in the rectum a small starch-water injection containing 1 drachm of chloral hydrate, the retention of which is secured by pressing for fifteen minutes against the anus a piece of ice in a cloth or the end of a towel wrung out of cold water. Velpeau recommends the placing for a few minutes of a large mustard plaster on the back between the shoulders and frequent immersion of both arms in hot mustard-water, the patient lying horizontally with her hips raised by a pillow, or the foot of the bed elevated about 8 inches higher than the shoulders. Some advise the application of very cold water to the vulva, but this is an uncertain measure.

In plethoric patients with a strong, vibrating pulse good results have been obtained from a venesection of moderate amount. From 8 to 10 ounces of blood may be taken from the arm (Depaul).

Unfortunately, in some cases the above measures fail, although diligently followed.

Curative Treatment.—If the hemorrhage and contractions increase, all hope is not to be abandoned so long as the membranes are not ruptured. The above remedies are to be continued—namely, the laudanum enemata, the chloral, the position of the patient, etc. Under these circumstances some children have occasionally been saved.

Danger from Hemorrhage.—Hemorrhage is sometimes very great after the rupture of the membranes. There is then no longer any hope of saving the child, and there is imminent danger to the mother.

The hemorrhage must be stopped; the surest way to accomplish this is by the tampon. The reason why the tampon sometimes fails is that it has not been properly applied.

Method of Using the Tampon.—Prepare a great number of balls of *non-absorbent* cotton, well-baked to render it aseptic (Hirst). It takes almost a hatful, says Pajot, of these balls, which should be packed through a speculum thoroughly into the anterior and posterior culs-de-sac or fornices of the vagina, filling the whole of this canal, and they should firmly be pressed against the os uteri (Fig. 1). They should all be tied together by a string to facil-

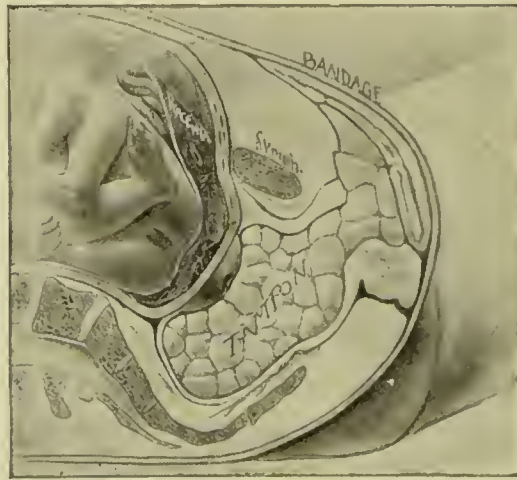


FIG. 1.—Tamponing the vagina with pledgets of cotton (Dickinson).

itate their removal. In filling the vagina too great pressure on the course of the urethra should be avoided, in order to guard against retention of urine and the necessity afterward of using the catheter. This tampon should be left in place from eight to ten hours, and be replaced by a fresh tampon if necessary. In removing it, the fetus, placenta, and membranes will in all probability be found

in the vagina. Iodoform or aristol gauze may be used in the same way instead of cotton, but it is not so reliable. In the absence of the above material any soft substance may be used, such as a soft handkerchief, etc.

Another method, the one which the author prefers, is to place the woman on her left side, and with the aid of a Sims speculum to plug the uterine canal with cotton steeped in a strong solution of alum or perchlorid of iron, and to finish the tamponing in the above-described manner. This plugging of the canal will effectually stop the hemorrhage. The canal being tightly corked up, no blood can escape, and one is master of the situation.

Ergot in Abortion.—Ergot should not be used as an oxytocic, because the muscularity of the uterus is not developed enough to be influenced by the ergot; but this drug will act very well as a hemostatic, its action being on the capillaries, which it contracts, on the heart, whose action it slackens and regulates, and on the spinal-cord vessels, which it contracts, thus diminishing the supply of blood to the uterus. Therefore ergot should be used in conjunction with the tampon.

If the ovum is found engaged in the neck of the uterus, it should not be removed, because, according to Meadows, it acts as a cervical tampon, exciting the contractions of the uterus by its presence, thus causing the expulsion of the ovum, placenta, and membranes intact.

When this expulsion is not too much prolonged, nothing should be done. Wait for bad symptoms. Moreover, Hegar has proved that the placenta, and even the ovum, may, under certain circumstances, be retained without danger for an indefinite period—for months and years.

Morgagni, Van Swieten, and others have reported several such instances.

Therefore, wait if the placenta is not engaged; continue the tamponing and ergot, especially if there be no accidents caused by the putrefaction of the placenta. In the latter case extract as rapidly as possible the contents of the uterus. The accidents are easily recognized by the fetor of the lochia, the odor from them being actually execrable and permeating the entire room. The lochia are dark, sanious, and contain detritus of the placenta and membranes. The patient is taken with repeated irregular rigors; the chills are followed by fever, the temperature rising as high as 104° and 105° F; the features are altered; tympanites is present; the pulse rises to from 100 to 110 beats: all these are symptoms of very great danger.

Under these circumstances hesitate no longer. Depress the fundus of the uterus, and with the finger extract, if possible, all the secundines. This operation is easy if the os is patulous; if not, express the contents of the uterus by Hoenig's method, strongly pressing the fundus against two fingers in the posterior fornix. This course will, however, often fail; then, if the os is still undilated, dilate it with laminaria tents, or, still better, with a Barnes or a Molesworth dilator; then try again to extract with the index finger, but much preferably with Mundé's, Pajot's, or Simon's curette, avoiding too much scraping of the uterine mucous membrane, for fear of causing thereby metritis or pelvic peritonitis.

This curetting should be followed by frequent intra-uterine injections of 5 : 100 carbolic acid, or, better, by 2 per cent. creolin, or Labarraque's solution of chlorinated soda, 2 tablespoonfuls to the quart of warm steril-

ized water. The bichlorid of mercury is not to be recommended unless used in the proportion of 1 part to 8000 of water. Even this proportion has proved dangerous on account of the extent of the absorbent denuded surfaces. These injections will be followed by a rapid fall of the temperature, as often observed. Quinin, in doses of 30 grains a day, with free administration of alcoholic drinks, is strongly recommended by Charpentier, and should be continued for several days.

Hygiene of the Patient.—Women often make too light of an abortion, but prudence dictates that they should be subjected to the same treatment and precautions in abortion as after confinement at full term. For a month they should take very little exercise, avoiding the lifting of weights, etc., because the uterus still remains subinvolved for at least a month. They will require a reconstructive course of iron, bark, and strychnia for several months following the abortion, else they may suffer with endometritis, uterine catarrh, and displacements of the uterus, for the treatment of which they will fall into the hands of gynecologists—for how long? Who knows?

What Pregnant Women should be Taught to Avoid.—To ensure a safe delivery the physician should advise all pregnant patients to refrain from violent exercise—for instance, long walks, long railroad journeys, bicycle riding, and riding in street-cars where the road-bed is rough or the motive power is violent. Under the writer's observation five miscarriages were occasioned in one month by the last-named cause: he has refrained from mentioning this fact to pregnant women, as many of them might take advantage of it to bring on a miscarriage, but physicians

should be apprised of it in order to bring conception to the blossoming period—always to be desired—the bringing forth of a fine healthy child. The physician should advise pregnant women to refrain from too frequent sexual intercourse, to which some women are much inclined during the early months of pregnancy. This desire appears also at the period of the menopause, and it is no doubt due to increased vascularity of the genital tract calling forth this morbid erotism. At other times this vascularity is relieved by the usual monthly menstrual discharge. The period of the menopause, so justly dreaded by women on account of its repeated hemorrhages, is also the cancerous age.

Tetanus from abortion is a rare accident, but it has taken place after minor gynecological operations. Sir James Y. Simpson was the first to notice it as a consequence of abortion, and he relates several cases which happened in his practice. Simpson was a universal genius to whom may pertinently be applied the words of Samuel Johnson in speaking of Goldsmith: *Nihil tetigit quod non ornavit*.

Verneuil mentions also a case where the tetanus was undoubtedly due to the traumatism caused by the abortion, and not to any special bacillus. A thorough examination made by a very competent microscopist revealed no special bacillus. Specimens of the dust from the room, from the ground on which the house was built, and even of the cobwebs from the walls, were obtained, because it is well known that attacks of tetanus have been attributed to cobwebs or to the soil holding bacilli. The specimens were sent to Dr. S. Toledo, a well-known microscopist, who made numerous cultures and inoculation-experiments with absolutely negative results. The

disease in this case could not conclusively be referred to any telluric cause, as is now claimed to be so important in the causation of tetanus.

The cases above cited would seem to show that the traumatism of abortion alone may cause tetanus. The disease is best treated, and often cured, by heroic doses of chloral hydrate, about an ounce a day (case of Prewitt). This surgeon cured a violent attack of traumatic tetanus in an adult by the above treatment, which should also be employed for the tetanus caused by abortion.

Here naturally arises the question, What is the longest term an embryo can survive its expulsion from the womb? Some authorities say only a few hours, and others say a day or more. The writer's opinion is, that an immature embryo may survive five or six hours.

CHAPTER II.

PUERPERAL HEMORRHAGES.

Varieties.—Puerperal hemorrhages, if not the most frequent, are certainly the most dangerous accidents to which the pregnant woman can be exposed, and the successful management of them will require in the physician a cool head and a stout heart indeed in order to be equal to the emergency.

“Every pilot
Can steer the ship in calms; but he performs
The skilful part who manages it in storms.”—SIR J. DENHAM.

The hemorrhages may occur *before, during, or after* labor,

and their gravity greatly varies. The hemorrhages may begin during the last three months of pregnancy, and may arise from several causes, especially from a partial detachment of the placenta. Their danger and treatment depend chiefly upon the mode of insertion of the placenta, and vary notably according as this insertion is normal or vicious.

The hemorrhage is more or less abundant if a considerable portion of the placenta, otherwise normally situ-

ated, has, from some violent or accidental cause, been detached. When limited, this separation causes only a slight hemorrhage, easily controlled, and puts the woman in no great danger, allowing her pregnancy to proceed to a happy termination. This condition constitutes a case of *accidental hemorrhage* proper, and is not caused by an originally abnormal implantation of the placenta, but by an accident which occasions its premature

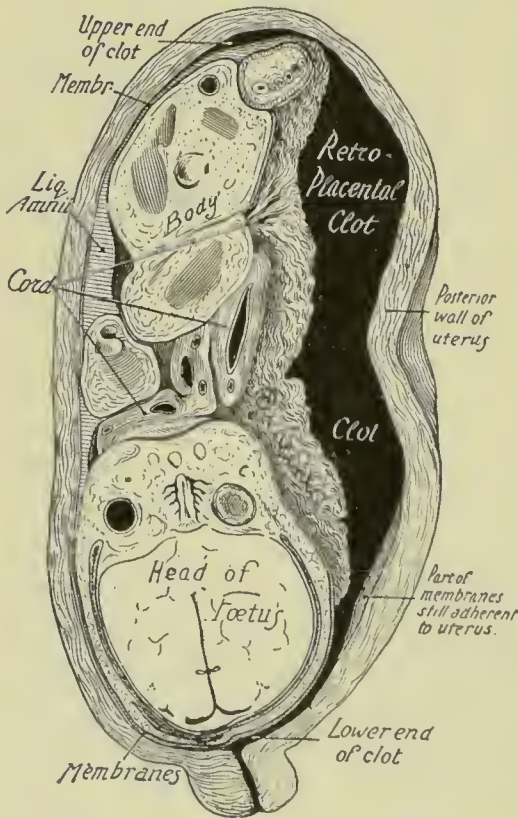


FIG. 2.—Accidental hemorrhage (Pinard and Varnier).

detachment and which gives rise to *unavoidable hemorrhage* (Fig. 2). Among the causes of this premature

separation of the placenta are external violence and exudative and degenerative changes in the decidua (Fehling, Goodell, Schauta).

Preventive Treatment.—In case of well-demonstrated albuminuria an exclusive milk diet should be recommended for some time, and if the hemorrhage persists, labor should be induced at the seventh or the eighth month; in case of uncontrollable hemorrhage after delivery the Porro operation would be called for (Kaltenbach).

As to the *causes* of the abnormal position of the placenta, we possess mere hypotheses. However, Osiander and Scanzoni have observed the abnormality to be most frequent in multiparæ.

The prognosis is in general unfavorable, from the danger of profuse hemorrhage during and for some time after labor, the great loss of blood causing cerebral anemia and syncope, and puerperal diseases, to which the woman is then particularly predisposed. The prognosis is more favorable if timely interference is had, thus generally saving the mother's life, and often that of the child. Statistics prove in these cases that one-seventh of the women and one-third of the children perish; but it should be remembered that the children are often born before their time, and consequently are weak and little able to survive.

Placenta Prævia.—One case of placenta prævia occurs in about two thousand labors. Fatality, according to reliable statistics, is, for the mothers, 25 per cent., and for the children 50 per cent.

In so-called "central insertion" of the placenta the os internum is rarely entirely covered; the larger and thicker part of the placenta is oftenest to the right of

the cervix, the smaller and thinner part of it to the left (Seifert); therefore the right hand should be selected when attempting to separate the placenta previous to turning.

Sometimes the placenta spreads out, occupying almost the whole internal surface of the uterus. The insertion of the cord is often marginal; hence the frequency of prolapse of the cord and also of transverse presentation of the child.

In *accidental hemorrhage* the flow of blood *ceases during a contraction*; in the various implantations of the placenta on the lower zone of the uterus the flow of blood *increases during a contraction*, as the latter tends to separate the womb more and more from the placenta.

The rare cases in which there was very little, if any, hemorrhage from the placenta are explained by Moreau, who says that the child was then dead, its death causing anemia of the placenta.

Abnormal presentation of the child is not infrequent, and constitutes another danger, on account of the delay in labor and of the necessity for interference. The death of the child, diminishing the hemorrhage, renders the prognosis more favorable for the mother.

In 22 per cent. of the cases the placenta has been found adherent (Mütter); this causes serious complications.

The Degree of the Uterine Contractions.—The contractions become regular and strong only after a certain time, and the more energetic they are the sooner will the labor end, and therefore the more favorable will be the chances for both mother and child (Charpentier).

Treatment.—An abnormal implantation of the pla-

centa constitutes one of the greatest perils threatening women in labor. When called in such an emergency the physician should weigh attentively all the circumstances of the case, avoiding haste and fuss, as also timid irresolution.

If the hemorrhage is at all serious, whether there be contractions or the absence of them, the resource at command preferable to any other is the use of the tampon. The objection to the tampon has been from those who did not know how to apply it; whereas, as generally employed in France, Germany, England, and America, it gives universal satisfaction. The tampon is nothing but a dam arresting the flow of blood, coagulating it, and sealing the mouths of the bleeding vessels, thus effectually arresting the hemorrhage.

The Tampon.—*How to Prepare a Tampon.*—Any soft substance which can be made to fill the vagina completely may be used. But all materials are not equally good; there is a variety of materials which can be employed in case of emergency. Baudelocque quotes the history of that old surgeon who in such a case, having nothing else at hand, stuffed the vagina with his wig, thus arresting a formidable hemorrhage.

The best tampon is made of balls of non-absorbent cotton or of lint, sterilized by baking (Hirst). These balls should be of the size of a large walnut, and each tied separately to a long piece of cord, kite-tail-like, thirty or forty in number, requiring from one pound to one and a half pounds of lint or of cotton—a *hatful*, says Pajot. As already stated in the treatment of abortion, the tampon must be large and solid enough to fill up the vagina completely. This canal, it is to be remembered, is quite distensible, especially in a multipara.

Many strips of iodoform gauze can also be used (Fig. 3), but they do not fill the vagina so thoroughly as cotton or lint. Introduce, therefore, enough tampons; it is



FIG. 3.—Placenta prævia: vagina tamponed with gauze (Dickinson).

because not enough have been employed that one fails. Apply then a compress of iodoform gauze and a T-bandage firmly pressed against the vulva.

Precautions.—Before applying the tampon, if there is time, empty the bladder and the rectum; avoid making the tampon press too much on the urethra. While the tampon is in place use the catheter every six or eight

hours. Before applying the tampon clear the vagina of clots, using hot water with 2 per cent. creolin or 5 per cent. carbolic-acid solution.

If possible, as recommended for abortion, the writer prefers to put the patient in the semi-lateral position and to use a Sims speculum, which enables one to fill completely the anterior and posterior fornices of the vagina with the tampon, and previously to plug the cervix with a large plug of cotton or of lint soaked in a pure solution of perchlorid of iron. A firm tampon should then be placed over the plug, which is thus maintained in place. A thorough tamponing of the vagina will successfully arrest the hemorrhage temporarily.

How long should the tampon be left in place? From twelve to thirty hours, if necessary (Pajot). In rare instances there may be an internal hemorrhage in the centre only of the placenta, its centre being freed, while its edges are still adherent. This is a hematoma or apoplexy of the placenta (described by Cruveilhier), of which the writer saw in this city (St. Louis) a case that nearly proved fatal. In this instance there were no external hemorrhages. Artificial interference alone saved the patient.

For the treatment of hemorrhages during the last two months of pregnancy, without an abnormal implantation of the placenta, but simply from a premature detachment of it while occupying its normal site, rest in the horizontal position is required; but if this does not control the hemorrhage and the loss of blood is alarming, a tampon should be used according to the method described above. If the flow is then not checked, forced delivery should be resorted to. Multiple small incisions around the

cervix should be practised in order to facilitate the introduction of the fingers or the hand into the uterus, and the forceps may be used or version may be performed according to the presentation of the child. This form of hemorrhage has been called "accidental" by Rigby.

However, during the last three months of gestation by far the most dangerous hemorrhages are those caused by an abnormal insertion of the placenta. This anomaly is called "*placenta prævia*." When the placenta is inserted over the internal orifice of the uterus, which it covers centre for centre, the insertion is termed *complete*; the insertion is termed *incomplete* when the orifice is covered only partially, and *marginal* or *lateral* when the edge of the placenta reaches only to the margin of the os internum without covering it.

In the *marginal* implantation of the placenta the flow of blood is intermittent, and increases with every contraction; these contractions draw apart the edges of the os corresponding with the placenta, and partially separate it more and more. The finger introduced in the os uteri can feel the edge of the placenta and the membranes. At that point the cervix will be felt swollen and soft. The hemorrhage increases as the orifice dilates and separates the uterine more and more from the placenta. When the membranes are ruptured the hemorrhage decreases, especially if the head of the child descends, and, under a contraction, presses upon the lower segment of the uterus, thus acting as an internal tampon, the labor terminating happily by the sole efforts of nature.

In marginal implantation of the placenta the hemorrhage begins with the first contractions of labor. This form of hemorrhage is rarely observed during early pregnancy.



FIG. 4.—Central placenta prævia, the os partly dilated (Hunter).

In the later months the precursory hemorrhages are due to a complete implantation of the placenta. But if the

placenta is directly placed on or very near the internal orifice, there are for some time before labor periodic hemorrhages, generally during the seventh, eighth, and ninth months of gestation—at first every two or three weeks, then oftener as the termination of pregnancy approaches. When the termination is reached the hemorrhage becomes more and more abundant and dangerous; it often happens without premonition, and sometimes when the woman is asleep.

Treatment of Hemorrhage from Marginal Implantation of the Placenta.—If there is no dilatation of the cervix, tampon the vagina. If the membranes protrude, the head or the pelvis of the child presenting, rupture the membranes; this will arrest the hemorrhage by causing contractions. Reapply the tampon *if the uterus is firmly contracted*; otherwise an external will be changed into an internal hemorrhage. Watch the effect of the tampon, and when the dilatation is sufficient—that is, from 2 to 3 inches in extent—extract the child with the forceps or with the hand according to the presentation. Remove the placenta, and, if the womb does not contract and the hemorrhage is alarming, introduce into the womb at one side of the placenta an aseptic sponge soaked in strong hot vinegar (Naegele). This is also Penrose's method. This sponge is to be left in until the hemorrhage ceases. Other means, hereafter to be mentioned in cases of internal hemorrhage, may be resorted to.

It is in these cases of premonitory hemorrhages that the writer does not hesitate to recommend the induction of premature labor at the eighth month of pregnancy, using the method later to be described; but it occasionally happens that in cases of placenta prævia there are no premonitory hemorrhages before labor begins. The

induction of labor is wisely suggested by the late Prof. Byford and by Barnes, Gaillard Thomas, and later authorities. The advantage of it is that one can choose his time, instead of being hurried off unexpectedly to a sudden case of hemorrhage happening in labor from placenta prævia. Gaillard Thomas thus saved 10 women out of 11, and 6 children.

During these profuse hemorrhages the foot of the bed should be raised about 8 inches, the woman's head lowered, and a binder firmly applied to the abdomen to prevent cerebral anemia, and perhaps fatal syncope, through brain and heart paralysis caused by the sudden depletion of the abdominal circulation. Wine, aromatic spirits of ammonia, comp. spirits of ether, and frequent hypodermatics of sulphuric ether should also be employed, as well as fluid extract of ergot frequently administered.

Cesarean Section in Placenta Prævia with a Highly-contracted Cervix.—When version or the application of the forceps cannot be performed, or the hemorrhage cannot be arrested by the tampon, have recourse to the Cesarean operation as a last hope, as some women are reported to have died as a consequence of profuse hemorrhage from an undilatable os uteri (Barnes). In this case Cesarean section should be performed to save both mother and child from certain death, observing the modern technique and due antiseptic precautions. (See the chapter on *Cesarean Operations*.) This extreme measure may save two lives. Professor Hutson Ford lately ably advocated this measure under the above conditions.

Complete or central placenta prævia entirely or nearly covers the internal orifice of the womb. This is the most dangerous and fatal accident that can befall the

pregnant woman unless prompt and timely measures are adopted to assist her—an accident which may cause her death as well as that of her offspring through the very vital acts intended to open to the fetus an entrance into the external world, and to give her the hope of soon pressing in her arms the child she has carried in her womb with more or less suffering (Naegele).

These are the circumstances in which the physician must take in the situation at once as to diagnosis and mode of treatment. He must act with coolness and deliberation, yet without undue haste. “I never hurry,” said Nélaton, “especially should I have only a short time in which to operate.” But do not temporize long ; act promptly and bravely.

Diagnosis of Central Implantation of the Placenta.—When in the course of her seventh or eighth month a woman has a hemorrhage which returns in a few days or weeks, and which is much aggravated at the end of her ninth month, one may be certain that it is a case where the placenta is centrally inserted over the orifice of the womb. As soon as contractions begin the hemorrhage increases. The contractions efface and dilate the neck of the womb, thus separating the cervical zone of the uterus more and more from the placenta, the blood beginning to flow in streams. Death is almost certain to follow unless prompt and decisive measures are taken. This form of hemorrhage has properly been called *unavoidable* by the older writers (Rigby). In very rare cases the first hemorrhage appears only at the time of labor (F. Glasgow's case).

The *touch*, which should be practised with extreme care and gentleness, will reveal the inferior segment of the uterus soft at the point of attachment to the placenta ;

the open os permits the finger to feel an irregular spongy mass, which is the placenta. The finger can vaguely perceive the child's head, which generally presents. Barnes recommends the greatest care in this examination, and especially in introducing the hand when performing version, as the cervix is very vascular and turgid in cases of central implantation; the most vascular and enlarged part of the womb being always where the placenta is attached. He guards against rough manipulation, which might cause tears of the cervix and dangerous hemorrhage, even after the placenta has been removed, as also septic infection, which may easily be produced. To facilitate recognition by the touch, the clots filling the vagina should be removed, and even then it is difficult to recognize any part of the child. Trunk presentation of the child is not unfrequent in placenta prævia, thus giving to the uterus a transverse instead of an ovoid outline.

The management of placenta prævia, as practised by Depaul, whose experience is extensive, is as follows: The tampon having been properly applied, he leaves it in place from twenty to thirty-six hours, according to the gravity of the case. After this length of time it is withdrawn, whether there is a beginning of labor or not. If the hemorrhage is arrested, no more tamponing is required, but the patient is carefully watched, and another tampon is applied if the bleeding reappears.

This tamponing suffices if there is no labor, but if labor has begun and there be no dilatation, a new tampon is inserted for a shorter period. If then the pains increase and the dilatation be sufficient, Depaul ruptures the membranes; this generally stops the hemorrhage. He then introduces the hand, separates that corner of the placenta where it is thinnest (Gendrin), and proceeds

to the turning of the child (by the bipolar method if possible), and extracts it very slowly, the presence of the accoucheur's arm and the breech of the child acting as an internal tampon to check all hemorrhage. The extraction should be very slow, an assistant pressing on the abdomen to prevent the child's head from extending and its arms from being thrown up against the sides of its head. This is the Dublin method practically, called also the "Kristeller method." This method greatly facilitates the birth of the child in cases of after-coming head. The slowness of extraction also guards the woman against cerebral anemia and syncope produced by the sudden depletion of her abdominal circulation. As soon as the child is born the placenta should be removed by the hands, if not already spontaneously delivered.

The placenta may be adherent, as found by Mütter in 22 per cent. of his cases. In this event gently break up the adhesion in the usual way. Immediately afterward the uterus should be washed out with large quantities of hot water made antiseptic with 2 per cent. of creolin or 5 per cent. of carbolic acid. The hot water will produce energetic and permanent contractions of the womb.

If the bleeding continues after the uterus is firmly retracted, it is owing to some serious laceration of the cervix during the manual delivery. Then wash out the vagina, and repair the laceration by putting in immediately four or five silver-wire stitches. Tampons of iodoform gauze should be placed against the cervix. This procedure will not produce an internal hemorrhage if the womb is firmly retracted. However, the patient should be watched. If the uterus enlarges, remove the tampon and inject hot antiseptic water; paint the neck of the uterus thoroughly with a solution of perchlorid of iron.

Post-partum Hemorrhage.—Hemorrhage may occur during or after the delivery of the placenta. It is caused by inertia or atony of the womb, and is usually called “post-partum hemorrhage,” which is a most dangerous and often fatal accident to the mother and the child. It requires on the part of the physician the greatest vigilance, courage, and rapidity of action. The woman may lose in two or three minutes two or three pounds of blood, which escapes in torrents, causing death quickly unless the hemorrhage is very soon checked. This hemorrhage is produced by a want of retraction of the uterus, and any measures that will awaken contractions of the uterus and its subsequent retraction must be employed, as we shall see later on.

Symptoms.—By abdominal palpation the uterus, instead of being felt hard, globular, and of the size of a child's head, will be felt large and soft as an empty bag, with no disposition to contract. The uterus is paralyzed. The woman is losing a much larger quantity of blood than in normal labor. The stream of blood increases, the woman becomes blanched and cold, she sighs and yawns, her breathing is shallow, she calls for more air and faints; there is no perceptible pulse at the wrist. Alarming as are these symptoms, she may yet rally if immediate measures are employed.

The above symptoms may also be present if the hemorrhage has become internal on account of the external flow being prevented by large clots plugging the os internum or by a marked anteversion of the uterus. As the blood fills the uterus the woman experiences a sensation of great heat at the lower part of the abdomen, and all the other symptoms above described increase in severity.

This uterine inertia, which is quite frequent, may have for its causes a too rapid expulsion of the child, the birth of twins, want of uterine contractility on account of a feeble muscularity of the uterus, or a very large child, or uterine neoplasms; or else paralysis of the site of placental insertion (Rokitansky).

Prognosis.—Of course, the prognosis of cases of post-partum hemorrhage is extremely grave. Death takes place often in a quarter or a half hour when the loss of blood is very great. This loss is borne better by some than by others, according to the individual constitution. It is astonishing how, after formidable hemorrhages, some women will recuperate, and be as well as ever in two or three weeks. It is certain that women can stand the loss of blood better than men, as before remarked. Does not nature bleed a woman to the extent of from 6 to 8 ounces of blood every month for thirty years of her life?

This remarkable tolerance to the loss of blood shows what a mistake it is to make a bugbear of bleeding women in inflammatory diseases—pneumonia, for instance, and especially in eclampsia—in which venesection is proved by late authorities to be generally the remedy *par excellence*.

Treatment.—In case of *uterine inertia* after the birth of the child and before the delivery of the placenta, measures should be taken to excite the contractions of the uterus by frictions on the abdomen, kneading it, using gently the Kristeller or Dublin method of massage, but taking great care not to detach by hand the adherent placenta, else hemorrhage will follow. If the placenta then becomes partially or wholly detached, profuse hemorrhage will occur, owing to the imperfect con-

tractions of the uterus. These are the hemorrhages so much dreaded by physicians. The blood then pours out from the open mouths of the non-retracted uterine sinuses. The internal surface of the uterus has appropriately been compared by Hunter to the surface of an amputation-stump.

Whether the placenta be wholly or only partially detached, if there be inertia of the womb a profuse hemorrhage comes on as a consequence; then the indication is to act very promptly, in order to save the patient, who in a few minutes may breathe her last. The whole hand should fearlessly be introduced to the bottom of the uterus, to empty it of placenta and clots; the hand should be kept in, and the ends of the fingers be made to titillate the internal surface of the uterus. The uterus will then be felt to contract; firm pressure on the abdomen should then be made, and the placenta be removed with one hand behind it. If there be much adhesion of the placenta, separate it with the fingers acting in the manner of a paper-knife separating the leaves of a book. If it is found impossible entirely to break up the adhesions, remove as much of the cotyledons as possible, taking care lest the uterine tissues should be perforated by rough and forcible handling. Doubtless this procedure may give rise to renewed hemorrhage or to septic resorption: of the two evils choose the least. This operation is one of the most difficult in obstetric surgery, as those who have performed it well know.

After the delivery of the placenta uterine contractions must be awakened by titillating the cervix; fluid extract of ergot in drachm doses, or tincture of cinnamon, should be given every fifteen minutes for some time, and again the introduction of the hand should be resorted to. We

may also use sulphuric ether, poured on the abdomen, drop by drop, from a height (Naegele), and finally intra-uterine injection of antiseptic hot vinegar (100° F.), using a double cannula in order to secure a return of the fluid used.

Finally, in very desperate cases Barnes' great remedy, of injecting the uterus with 1 ounce of liquor ferri perchloridi to 4 ounces of water, should be resorted to. This measure, however, is considered dangerous on account of the possibility of thrombi forming in the sinuses and becoming the cause of cardiac or pulmonary embolism.

It is safer to use the classical methods; also, as a temporary but efficient means, the accoucheur should strongly compress the abdominal aorta above the uterine globe, the accoucheur being relieved after a while by an assistant. Although a little fatiguing, the compression may be continued for some time. This measure was first proposed by Trousseau. The patient's condition is peculiarly adapted to this compression of the aorta, because of the relaxed condition of the abdominal walls, and no chloroform is needed to overcome the resistance of the recti muscles. While the left hand is in use, "doubled as a fist, and laid with its ulnar surface downward, firmly compressing the aorta," the right can be employed in grasping and kneading the uterus; thus both the uterine arteries and aorta are compressed and the muscular walls excited to contract (Bishop).

This is a life-saving as well as time-saving measure. During its application the other means, as above described, local and general in character, can be brought to bear upon the inert uterus, giving the patient a chance to rally.

Frequent doses of alcoholics should be administered; also often-repeated small doses of opium be given as a tonic (Rigby). Hypodermatic injections of sulphuric ether and ergotin should also be administered; the ergot here acts chiefly as a hemostatic, while it contracts the uterine fibres.

Auto-transfusion, performed by bandaging firmly the extremities so as to cut off arterial and venous circulation, may be tried in order to store up in the woman's heart and brain some of her remaining blood. The Esmarch bandages might find their application in such an emergency. This measure was suggested by the late Dr. Linton, and is practised by the savage Africans for uterine and other hemorrhages.

Finally, transfusion from the arm of a friend may be tried, but it has met with poor results, 2 only out of 14 reported cases recovering (Schroeder).

It occasionally happens that after the uterus is properly retracted, the hemorrhage arrested, and there is assurance of the safety of the woman, a secondary hemorrhage with a now non-contracted uterus occurs. The above-described measures must again be resorted to, but no tampon should be applied, else the external hemorrhage would be converted into an internal one. In fact, no tampon should be used in any case after the rupture of the membranes, either in accidental or in unavoidable hemorrhage, because the uterus would fill up with blood. In these cases, besides the above measures, and in order to cause the uterus to contract, the cervix should freely be painted with a pure solution of the perchlorid of iron, and hot antiseptic uterine injections be employed.

It may be superfluous to state that after these profuse

hemorrhages the woman's strength should be husbanded by all reconstructive measures at the physician's command, broths and wine or brandy being freely given. The patient should occupy a horizontal position, with the head low, for several days, and have an abdominal binder firmly applied.

In conclusion, it must be stated that during those terrific hemorrhages accompanying placenta prævia no attempt should be made to empty the uterus until the almost moribund woman has rallied; else she might expire while the hand is in her womb. But after she has recuperated to some extent, then version should be performed, if possible, by the method of Braxton Hicks, or the forceps should be used if the placenta is marginal, and a very firm binder applied to guard against the syncope caused by cerebral anemia occurring after the sudden emptying of the abdominal circulation of the woman, and from heart-paralysis.

Hemorrhage with a Perfectly Retracted Uterus.—A very considerable loss of blood will continue in some cases. This bleeding is due to a laceration of the neck of the womb during artificial extraction of the child, or, in natural delivery, to the size of the head if this be large or highly ossified. This secondary hemorrhage may also be caused by wounds of the vestibule or by the rupture of a thrombus. This hematoma may have its seat either in the labia or in the periuterine areolar tissue. These lacerations must be treated by the usual means, such as suturing, the free use of perchlorid of iron, and stuffing the vagina with iodoform gauze, until the uterus becomes firmly and permanently retracted and all bleeding is checked. It must not be forgotten that after these profuse hemorrhages the patient is frequently attacked with

puerperal diseases—septicemia, metritis, phlegmasia alba dolens, and the convulsions of profound acute anemia.

CHAPTER III.

ADHESIONS AND RETENTION OF THE PLACENTA, AND INVERSION AND RUPTURE OF THE UTERUS.

THERE is frequently a delay in the physiological expulsion of the placenta from a want of uterine contractions. In this case the remedy is patience. If, however, after waiting half an hour, there be no progress, gentle recourse should be had to the Credé method of expression of the after-birth (Fig. 5); one should proceed very gently, and only *during* an awakened contraction. The objection to this method is that, when roughly done, it has in some cases produced metritis and the retention of membranes and clots, which may become sources of infection.

Adhesion of the Placenta.—If, after waiting a half hour and using the Credé method, the placenta is not normally delivered, adhesion should be suspected; this, however, is a rare accident. This suspicion would be confirmed if the placenta were not felt in the neck of the womb, and if, gentle tractions being then made on the cord, it became tense and retracted as the tractions ceased. The fundus of the uterus is felt to follow the tractions, and rises when they cease.

Treatment.—Introduce the hand into the uterus. If there be hemorrhage, it is owing to the partial detach-

ment of the placenta; if there be no hemorrhage, wait an hour. Give *no ergot*, which would contract the os and cervix, produce an hour-glass contraction, and pre-



FIG. 5.—Crédé's method of expressing the placenta, showing also episiotomy incisions (Dickinson).

vent the introduction of the hand when needed. If hemorrhage begins, introduce the hand, hook a finger in the thickness of the placenta, and remove the latter by traction made by a scraping process; leave no part of it in the womb. Act very prudently, for fear of removing some part of the uterine tissue or of perforating the

uterus. "This is the most delicate of obstetrical operations" (Charpentier).

After the removal of the placenta, intra-uterine injections of hot antiseptic water should be used largely three or four times a day for a week, in order to wash out some possible remnants of placental cotyledons or clots. If the discharges become purulent or fetid, intra-uterine injections of dilute Labarraque's solution or of peroxid of hydrogen may be employed (F. Glasgow). Quinin and brandy should be administered freely to guard against septicemia.

Spasmodic or Hour-glass Contraction of the Uterus.

—Stoltz divided these spasmodic contractions into those of the external and those of the internal os and those of the body of the uterus, constituting what is understood as an *hour-glass* contraction of the uterus, in which condition the placenta is incarcerated (Guillemot) or is strangulated.

Treatment.—If there be no hemorrhage, wait, but not too long. Use laudanum per rectum, warm flaxseed-tea vaginal injections, and, after a few hours, give the patient chloroform as an analgesic. Introduce first one finger, then two fingers, dilate the contraction, and remove the placenta.

If there be hemorrhage, wait no longer: dilate the contraction and remove the placenta, adherent or not. If not successful, use Dubrock's plan: with one finger through the placenta enucleate the latter by reducing it to a pulp, and use repeated antiseptic uterine injections to wash out the fragments of the placenta and to prevent septic infection, keeping the patient well guarded by quinin and brandy freely given; also frequently administer ergot to promote involution of the uterus and to act as a hemostatic.

These are the cases where intra-uterine injections of a solution of pure peroxid of hydrogen should be employed. In some rare cases portions of the placenta have spontane-

ously been expelled, but only after several days—thirty-seven days in a case reported by Charpentier. The patient recovered. Great gentleness should be observed in these manipulations, for fear of rupturing the uterus or causing metritis.

In spasmodic contractions of the uterus the succinate of ammonia, in 15-grain doses every two hours, has been recommended by Stoltz after the failure of enemata of chloral and laudanum.

Inversion of the Uterus.—*Complete* inversion is a very rare accident, happening once in about one hundred thousand labors. Still, any obstetrician might meet with this formidable ac-



FIG. 6.—Inversion of the uterus: drawing from an old specimen in alcohol. The atonic chief site of placental attachment (*c*) is shrunk by the alcohol, and thus its lessening is explained; *b*, contraction-ring; *a*, external os uteri (after J. Veit).

cident, and he should be prepared to treat it. The mortality of recent cases from shock and hemorrhage is great, being about 30 per cent. The inversion may simply be a depression of the fundus, or it may be complete. The

simple depression is not uncommon; other varieties of inversion are very rare. When complete inversion occurs a large red bleeding tumor protrudes from the vagina, with or without the placenta adhering to it (Fig. 6).

Causes.—The causes of inversion are inertia of the uterus and laxity of its walls; undue pressure practised from above downward by the hand on the fundus, or rude tractions from below by unskilful attempts at delivery of the placenta through tractions on the cord; also, delivery in the erect position.

Symptoms.—When the inversion is complete, excessive pains and severe hemorrhage, syncope, and collapse accompany the condition.

Treatment.—The treatment must be immediate, to reduce the tumor by gentle taxis. If the placenta be adherent, it must be peeled off before returning the tumor. After the reduction of the tumor the closed fist should be kept against the os until the uterus firmly contracts. Ergot should be given, and the recumbent position be kept for several days. If the inversion has become chronic, recourse should be had to methods detailed in treatises on gynecology.

If the inversion has not lasted more than four hours, it can still be reduced simply by taxis. After that period the method for reducing chronic cases must be resorted to. If not successful and the woman be in danger of death, even amputation of the uterus may become justifiable—of course a formidable operation.

Rupture of the Uterus.—This accident is among the gravest that may occur during labor, as it is generally followed by the death of both mother and child, and may render the physician liable to suspicion of malpractice if it happens during some obstetric operation.

Frequency of the Accident.—Statistics of the frequency of rupture vary considerably. Thus, Collins of Dublin found 1 case in 432 labors; Brandt, 1 in 1200; others, 1 in 3000 labors. But these statistics, as remarked by Hirst, may have two sources of error. Fatal cases, though known to the obstetrician in attendance, do not always find their way into medical journals; others are not known even by the medical attendant, and are recognized only at the post-mortem examination, the patient having been reported as dying from septicemia. Hervieux remarks that in some cases the uterine tear is made *silently*, presenting neither pain nor complaint nor a crisis, and if the patient dies, which is usually the case,

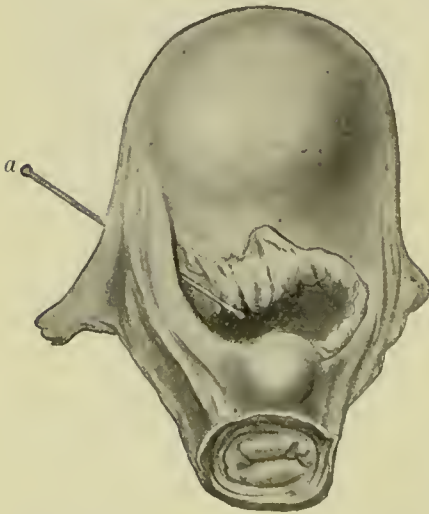


FIG. 7.—Transverse rupture of lower segment of uterus (Spiegelberg): *a*, probe inserted under the peritoneum.

one is astonished to find at the autopsy a rupture which had not even been suspected. Many other cases remain unknown or are never reported as such, having been attended by ignorant midwives or by unscrupulous physicians. It is, then, probable that this accident, by no means frequent, is less rare than is indicated by published statistics.

Causes.—Most frequently the rupture takes place at the posterior part of the organ, that corresponds with the promontory of the sacrum, from the pressure and attrition which often take place during labor, especially if the uterine tissue is in a morbid state of softening.

Next in frequency is a rupture of the left lateral portion of the uterus.

The direction of the rupture is sometimes diagonal or transverse (Fig. 7), rarely longitudinal. Sometimes the uterus presents only a simple perforation, as when it has pressed upon some of the bony asperities found at the superior edges of the pelvis, especially along the course of the ileo-pectineal line, where are occasionally found the aretine osteophytes so well described by Depaul, who says that this anomaly is not very rare, since he has found in his collection of pelvis twenty-four marked cases. These osteophytes or projections probably originate, says Billroth, from some subacute inflammatory irritation of the pelvic periosteum and the surface of the bone. They generally are present in rickety subjects with a contracted or a distended pelvis. These projections exist in the shape of sharp knife-like blades



FIG. 8.—Pelvis spinosa (Hirst).

or spicula; they are generally found near the spine of the pubis or along the ilio-pectineal eminence, and sometimes on both sides of the pelvis. It is easy to understand that, if these projections coincide with a narrow pelvis, a

rupture may readily take place by attrition of the uterine tissue pressing on these projections and wearing through by friction. Another cause of the laceration is an undue incurvation of enlarged and projecting spines of the ischium, and also a very sharp encroaching promontory, especially if there be a marked narrowness of the pelvis in its sacro-pubic diameter. Kilian has recently studied this particular disposition of the ileo-pectineal eminence and the formation of osseous spikes on the pelvis. He calls such pelves *Stecherbecken* (pelvis spinosa, Fig. 8), and considers them a frequent cause of rupture of the uterus.

Other Causes.—Spontaneous ruptures are occasioned by certain morbid conditions of the uterus; there are, besides, *violent* and *accidental* ruptures produced by external causes, such as obstetric operations, or more rarely by cattle-horn injuries, as reported by Harris.

Spontaneous ruptures originate from a pathological condition of the uterus—the thinning and softening of its tissue, the unequal development of its muscles, neoplasms, and atresia of the neck. This atresia is sometimes produced by strong caustics after impregnation. These causes produce the accident more frequently than do obstetric operations. The uterus will burst when, with a contracted pelvis, the woman suffers uncontrollable strong contractions, especially when the presentation of the child is abnormal. If a male child the danger is greater (Simpson). Strong contractions and an unyielding cervix have sometimes produced an annular separation of the cervix. Barnes refers to a case of this ring-form detachment. To these causes should be added the injudicious administration of ergot during labor. Hodges states that he never saw a case of rupture of the uterus

in which ergot had not been given to reinforce contractions.

This rupture may be produced by the imprudent and unskilful use of the forceps or the crotchet, the blades of the forceps having been applied *externally* to the cervix. The operation of version may also cause this accident. In that case the forcible introduction of the hand into the uterus when this organ is strongly contracted on the cord may cause rupture if a morbid condition of the uterus exists, even when only very moderate efforts have been made by the accoucheur. This rupture may frequently be produced by an increase of the volume of the child, this increase in volume being caused by hydrocephalus or by abdominal tumors. Sir James Y. Simpson states that out of 74 cases of intra-uterine hydrocephalus the uterus ruptured in 16 cases. In these instances the labor is particularly severe and tedious, even with a normal pelvis. The writer has seen labor last in one case seven days before it was ended by puncturing the hydrocephalic sac, allowing the escape of more than a quart of water, after which the head collapsed and was delivered without further trouble. The patient recovered in this case, however, without rupture of the uterus. In the statistics of Schuchard there are 13 cases of this accident in 73 cases of hydrocephalus. This accident has happened much more frequently in multiparæ than in primiparæ, only 12 per cent. of the latter having been found among the entire reported number (Bandl), which percentage depends probably upon the fact that shoulder presentations are more frequently found in multiparæ. The proportion, according to Pinard, is as 7 to 1.

Symptoms and Diagnosis.—Rupture of the uterus is

generally produced suddenly and during the period of expulsion, without any premonitory symptoms. However, in the case of a morbid condition of the uterus the rupture is sometimes preceded, during pregnancy, by pain at the affected part, without one being able to interpret the value of this sign.

In labor, during a contraction, the patient experiences at a certain point in the womb a very violent pain, absolutely different from labor-pains. This pain draws from her an agonizing cry. She says that something has broken in her abdomen, and points with her hand to the painful spot. The contractions diminish suddenly, and soon cease. Sometimes a slight discharge of blood issues from the vagina, but this sign may be wanting. The patient's features are altered, expressing profound terror, and all the symptoms of severe shock and collapse are present. By palpation the fetal parts are distinctly felt under the muscles of the abdomen if the fetus has escaped into this cavity through a complete rent of the anterior or lateral part of the uterus. The womb is felt behind reduced in size.

By the touch one recognizes that the part which presented at the superior strait has receded from it or has been replaced by another fetal part. Ordinarily, an external hemorrhage then takes place. The hand on being introduced can feel the rent and a protrusion of the bowels if the uterus is not strongly contracted.

The signs of the passage of the child into the abdominal cavity naturally fail if the head is already solidly fixed or if the wound is not complete. These are the cases which have previously been alluded to as *silent ruptures*, when the concomitant signs of complete rupture fail. The attention is then awakened by the almost

entire cessation of the contractions and the gradual weakening of the patient.

Trask, in summing up the subject, regards the principal diagnostic marks of rupture of the uterus as two—the recession of the presenting part, and the power to distinguish the limbs of the child directly under the abdominal walls.

Treatment.—The rupture having taken place, the treatment consists in at once extracting the child and the placenta. So long as the child has not entirely passed into the abdominal cavity, the extraction must be made through the natural passage, according to the rules of art, taking great care not to enlarge the wound by operative procedures. The placenta must be extracted by traction on the cord or by the hand, but *not by the Credé method* of expression, which would cause the passage of the placenta into the abdominal cavity through the uterine wound (Naegele). The forceps should be employed if the head of the child is within reach, or version in shoulder or pelvis presentations. But when the child has completely escaped through the accidental opening, laparotomy should immediately be performed by the modern technique and with all the aseptic measures at command. Laparotomy in ruptured uterus should also be done in contracted pelvis if the head cannot be extracted by the forceps, especially if the child be living. After the child has been removed, if there be considerable hemorrhage and great vital depression, repeated small doses of opium, alcoholic stimulants, and quinin should freely be administered; hypodermatic injections of sulphuric ether should also be given. No hemostatic injections should be used, because they would penetrate into the abdominal cavity. If intestinal loops have escaped

into the vagina or are strangulated, they should be replaced.

Several feet of bowel may escape through the uterine rent and fill up the vagina. Ignorant physicians and midwives have mistaken the bowel for a prolapsed umbilical cord. A mistake of this kind, made by two doctors, happened several years ago. An eminent obstetrician of this city (St. Louis) was called into consultation by these doctors, and before he had made an examination of the womb they called him into the garden: one of them, removing with his foot a bunch of dry leaves from the fence-corner, said, "Look, doctor!" and, stooping down, raised with his hand from under the leaves a coil of intestine about 3 feet long; "this is what we took to be the child's navel cord. We tied and cut it off. Therefore there is no need of your seeing the patient." In fact, she was moribund, and died soon after. The doctors escaped without a suit for malpractice.

A similar case is reported by Meadows, when the prolapsed intestinal coils had been cut off by the physician, who took them to be a protruding umbilical cord. The physician in this case was sentenced to ten years' imprisonment.

The subsequent treatment of ruptured uterus is that of penetrating wounds of the abdomen.

The expectant method consists in leaving the child in the abdominal cavity and trusting to nature. This method should not be thought of, unless the mother is so weakened that she could not survive the perils of gastrotomy. In this instance one must for the time act as if it was a case of extra-uterine pregnancy, in which nature tends to expel the child by a process of suppurative elimination or transforms it into adipocere or into a stone child

(lithopedion). After the patient has sufficiently recovered from the immediate peril a secondary laparotomy should be performed to save the woman from the severe ordeal of slow sepsis and exhaustion.

The question arises whether it is not wise to perform gastrotomy in all cases of complete rupture, even when delivery by the natural passages has been accomplished, provided the rent does not close with the contractions of the emptied uterus. As complete rupture is almost inevitably followed by the intraperitoneal effusion of blood, the patient's condition is thereby rendered extremely desperate. Gastrotomy in such cases enables the operator to cleanse the abdominal cavity, and, if necessary, to introduce sutures as a means of preventing further bleeding from the uterine wound.

The results from gastrotomy performed for the removal of the child after it escapes into the abdomen are extremely encouraging, Trask's statistics showing 76 per cent. of recoveries, those of Jolly 69 per cent., and the United States statistics, collected with indefatigable zeal by Harris, $53\frac{1}{2}$ per cent. If the bleeding from the uterus cannot otherwise be arrested, a Porro operation should immediately be performed, and the cavity of the abdomen thoroughly cleansed with aseptic sponges and hot antiseptic douches, using a gallon or more of hot sterilized water, the heat of which greatly tends to prevent shock.

CHAPTER IV.

OBSTACLES TO LABOR.

Contraction of the Pelvis.—This contraction may occur in a great variety of degrees, and may render the birth of the child either very difficult or impossible without artificial aid. The different forms of pelvic contractions have carefully been described by Litzmann and Michaelis, and for their further study the reader is referred to the masterly treatment of this deformity by Lusk, Cazeaux, Naegele, and Parvin. Writers on the subject state that in Europe the average frequency of contracted pelvis is 14 per cent., while this anomaly is rarely to be found in American-born women. This immunity is owing to the less laborious modes of living in America. Pelvic contractions in Europe, happening in women belonging to the lower classes, are caused by severe exertion, such as hard labor in rural and factory work, climbing mountains with heavy weights on the shoulders, etc., and also from the prevalence of cretinism in some of the mountainous regions between France, Germany, and Switzerland. A traveller in Holland once saw a woman and a dog together drawing a canal-boat, and in Vienna he saw a poor woman carrying a hodful of bricks on her shoulders up a steep, high ladder. There is in the United States an exemption in favor of the negro women working in the field, on account of their large and shallow pelvises. Negro women generally have easy labors.

In contracted pelvises the diminished space is, in the great proportion of cases, chiefly at the brim, but there

remain also some forms of rare occurrence, as described by the above-mentioned authorities, especially by Naegele.

Diagnosis of Contracted Pelvis.—This diagnosis is based upon direct examination. The previous history of the woman should also be learned. Was her growth and dentition tardy? Has she a square head, a pigeon-

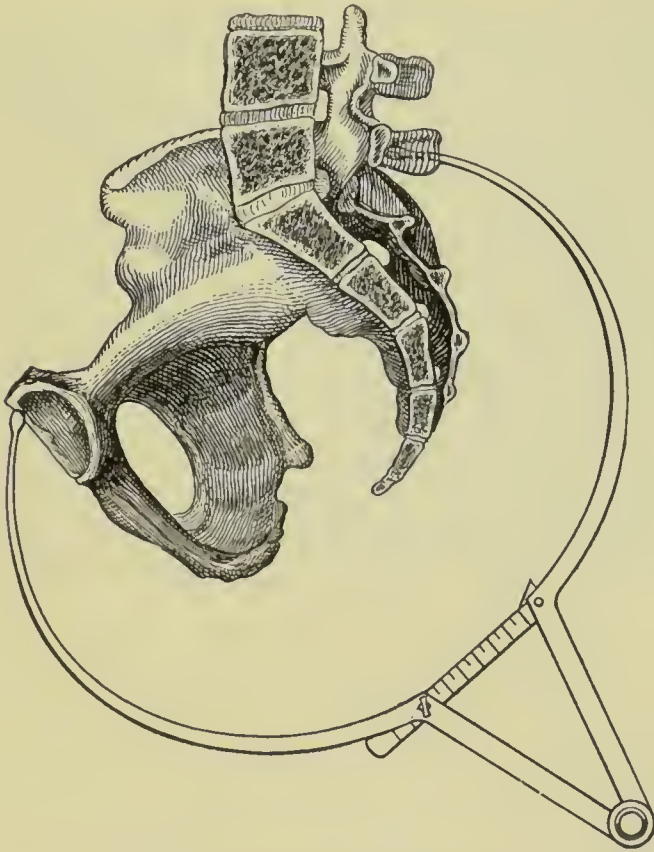


FIG. 9.—Baudelocque's pelvimeter.

breast, a tumefied abdomen, small stature, spinal curvature, enlarged joints, and incurvation of the long bones of the extremities? The above appearances are to be regarded as characteristic of rickets; but it should be

borne in mind that not every case of mild rachitis is followed by pelvic narrowing (Lusk).

Pelvimetry.—Many very ingenious and useful contrivances have been devised for measuring the pelvis, such as Baudelocque's (Fig. 9) and Von Heuvel's callipers, and also the pelvimeters described in treatises on obstetrics, but these instruments are not always at hand, while the obstetrician always has his fingers with him, and a digital examination is all that is required in the great majority of cases. Most index fingers are 4 inches long from the extremity to the top of the knuckle formed by the metacarpo-phalangeal joint; the same finger is 3 inches long from its end to the commissure.

The Proper Way of Using the Finger.—The woman being placed on her back, the index and middle fingers, well oiled, should be introduced into the vagina. By pushing the posterior vaginal wall backward the points of the fingers are made to reach the sacral vertebræ. Then, following the sacrum upward, the promontory is reached; in order to do this it is necessary to sink the elbow and give the fingers a nearly vertical direction. The resistance of a rigid perineum and of the vaginal wall is best overcome by continued steady, upward pressure. During the examination the patient should be requested to raise her hips. In practice there is a possible source of error—namely, an angle may form between the first and second sacral vertebræ, where their union has been incomplete, producing a “false promontory” beneath the true one (Litzmann).

Precautions should be taken to separate the labia externa and the nymphæ; the index finger of that hand which is not in the vagina is applied with its back against the vestibule, upon which it is slid until the end

of the nail touches the finger in the vagina. The two fingers should come together precisely on the lower edge of the symphysis pubis. Pressure with the nail will make a sufficient mark upon the finger in the vagina. The latter finger is then withdrawn, and the distance is measured by an inch-rule or by the measure given above from the length of the index finger (Fig. 10). In this way the distance between the sacro-verte-

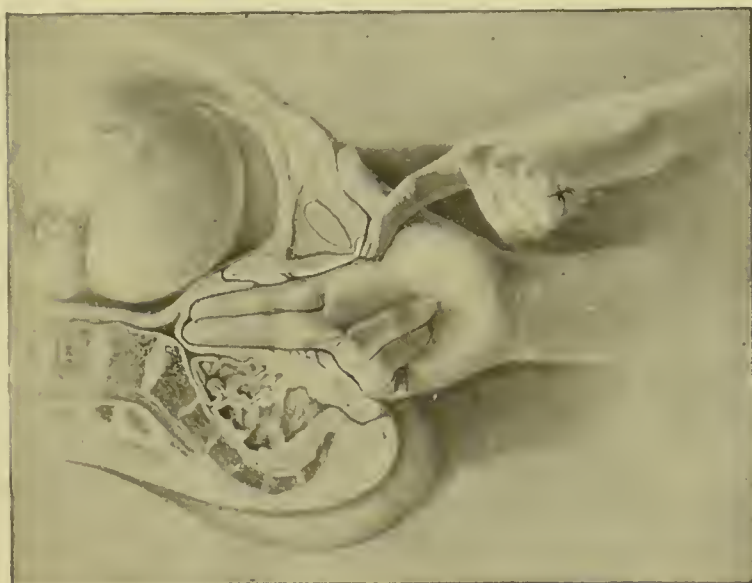


FIG. 10.—Manual measurement of the pelvis (Dickinson).

bral angle upon which the end of the finger rested and the lower edge of the symphysis pubis is very readily determined. But this oblique or diagonal diameter is longer than the antero-posterior or true diameter of the superior strait, which is reckoned from the posterior superior part of the symphysis; consequently, the excess must be deducted, and by subtracting about one-half of an inch for a large pelvis, and one-third of an inch for a small one, we shall have very nearly the extent of the sacro-pubic interval.

Madame Lachapelle observes that if the end of the index finger is unable to feel the promontory of the sacrum, the true conjugate diameter of the pelvis is normal. However, it should be remembered that the conjugate diameter of a contracted pelvis has not a constant length, but varies according to the position of the woman. Wachter, in order to ascertain this fact, experimented with pregnant women having contracted pelvises. He placed each on her back, so that the superior part of the body was raised as little as possible, and the knees made to approximate the abdomen very closely; the promontory was then reached easily, and the six women upon whom he experimented had in the diagonal conjugate the following dimensions: $3\frac{1}{2}$ to $3\frac{3}{4}$ inches. Now, if a cushion was placed under the woman's buttocks and her legs extended, the diagonal conjugate diameters were ascertained to be from 1 inch to $1\frac{1}{4}$ inches longer.

It must also be remembered that frequently in pregnancy the sacrum is mobile, and that consequently the promontory can get nearer to or farther from the pubis in labor. There may also be an overriding of the pubes, accompanied by an increase of one of the oblique diameters of the superior strait. The sacro-pubic diameter may also be found augmented by the advancement of one of the coxal bones. Finally, says Madame Lachapelle, it may be possible for both hip-bones to glide forward simultaneously, thereby enlarging still more the antero-posterior diameter (a phenomenon also observed by Duncan). Madame Lachapelle observed this in a number of cases. This fact makes the prognosis of a contracted pelvis less unfavorable. This movement also explains the possibility of women with contracted pelvises giving birth to living children after long and hard labors, the

favorable issue much depending, however, on the position of the child. Too much uncertainty and too long hesitation should not, however, tie the physician's hands, thus permitting the escape of an opportunity upon the seizing of which may depend the saving of two lives.

Indications and Treatment.—In a contracted pelvis, measuring at least $3\frac{3}{4}$ inches in its smallest diameter, what is to be done by the accoucheur? Wait, trust to the efforts of nature, because a spontaneous delivery is possible under such circumstances. But when the labor has become powerless, the membranes ruptured, the woman exhausted, the head making no progress for one hour or more after it has been engaged in the excavation, the forceps should be applied. The child's heart having carefully been auscultated in order to ascertain its life, its death, or its gradual weakening, the mode of acting will then suggest itself.

In Presentation of the Pelvic Extremity.—If there be delay in the expulsion of the after-coming head, its delivery should be hastened by the Nancy or the Prague method (see *Delivery of the Breech*). If not successful, the forceps should quickly be applied in these head-last cases.

In Face Presentation.—In a well-formed pelvis after some delay nature generally terminates the case happily, but not so in a contracted pelvis. If the chin be posterior at or above the superior strait, podalic version should be attempted. If not successful, Cesarean section or symphyseotomy should be performed. In this position rotation of the chin forward must be so extensive that it will certainly kill the child if attempted.

When the Child Presents by the Trunk, Podalic Version

is Demanded.—There is in these contracted pelves a peculiarity to be noted: it is when the base of the sacrum projects forward a little to one side. This deformity causes a constriction of one side of the pelvis, the other remaining of the normal size. This peculiar deformity is called the “oval-oblique pelvis,” first described by Naegele, the celebrated professor of Heidelberg. In performing the evolution of the fetus and in drawing on its pelvic extremity under such circumstances, it would evidently be necessary to turn the posterior plane of the fetus toward the larger half of the pelvis, so that when the head presented at the superior strait its large occipital extremity would occupy the non-contracted side of the pelvis (P. Dubois).

Contraction of the Pelvis measuring between $3\frac{1}{4}$ inches at most and $2\frac{1}{2}$ inches at the least in its smallest diameter.—In this case what should the accoucheur do? If the child be living and the smallest diameter of the pelvis be from 3 to $3\frac{1}{4}$ inches, the forceps may be used, avoiding violent and too prolonged efforts; if not successful, pelvic version may be performed; if no favorable result is obtained in delivering the after-coming head, one should see whether the child be dead, its death being ascertained by the absence of its heart-beat and by pulling down and feeling a loop of the cord. If palpation of the cord, persisted in for at least fifteen minutes, reveals no pulsation, the life of the child is certainly extinct, and the child may be delivered by craniotomy on the retained head or by decapitation.

With a least pelvic diameter of from $2\frac{3}{4}$ to $3\frac{1}{4}$ inches, however, the Cesarean operation or that of symphysiotomy, is the safest for mother and child, if undertaken as soon as the difficulty has been recognized

and if the child be living. Under these conditions these operations have lately proved successful in the hands of Pinard, Leopold, Morisani, Zeifel, Noble, Garrigues, Jewett, and Harrigan.

These various degrees of minor contraction, when ascertained in time, call for the induction of premature labor at seven and a half to eight months. (See *Induction of Premature Labor*.)

With a pelvis measuring $3\frac{1}{2}$ inches and upward in the conjugate no interference, as a rule, is called for. Says Lusk: "Since it has become the custom to measure pelves with accuracy, the profession has learned that these moderate degrees of deformity exercise their influence not so much in a mechanical way as in the modifying effects they produce upon labor. A large proportion of the cases terminate spontaneously. If the pains fail prematurely, the conditions are generally such as to make it an easy matter to deliver with the forceps."

With a pelvis measuring from $3\frac{1}{2}$ to 3 inches in the conjugate delivery by version gives the child a greater chance of living than does delivery by the forceps.

James Y. Simpson years ago taught the advantages of version in contracted pelves. Madame Lachapelle in France and Lusk and Goodell in America have also advocated this expedient. In pelvic presentation greater facility of birth, says Simpson, is caused by the head entering the pelvis as a wedge by its shortest diameters, which are, first, the bimaistoid, then the bitemporal, and finally the biparietal. At the same time the fronto-occipital descends into the transverse diameter of the pelvis. An inch is gained through the compression of the cranial vault by the sides of the mother's pelvis, and as a

result biparietal flattening is obtained, and a deep groove, usually near the coronal suture, is produced. In many cases this groove is produced upon the posterior cranial surface by the pressure of the projecting promontory. Simpson once illustrated this fact by showing to his class the head of one of the students whom he had delivered by version, and in whom the groove had remained permanently. This compression causes also the lapping over of the sutures and fontanelles, and a retreat of a considerable portion of the cerebro-spinal fluid into the spinal canal, thus producing a still greater reduction of the head.

What is to be done when the dimensions of the pelvis are under $2\frac{1}{2}$ inches?—The spontaneous or artificial expulsion of the child is here physically impossible. There are, however, a few recorded cases in which, by such expert operators as Barnes, Michaelis, and others, the mutilated body of a fetus has been delivered through a diameter of 2, and even of $1\frac{1}{2}$, inches, with, however, in all instances, very great injuries to the mother, which in severe cases eventually proved fatal.

The instruments preferably used, after perforation, are Lusk's (Fig. 11) or Blot's cephalotribe or Tarnier's basiotribe (Figs. 12, 13). But Lusk considers that with

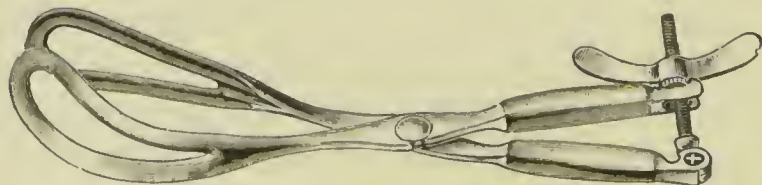


FIG. 11.—Lusk's cephalotribe.

$2\frac{3}{4}$ inches in the conjugate the limit for the safe use of the cephalotribe has been reached. The only alternatives

left, then, are the Cesarean operation or Thomas's laparolytrotomy; symphyseotomy not being here admissible, on account of the extreme contraction of the pelvis that

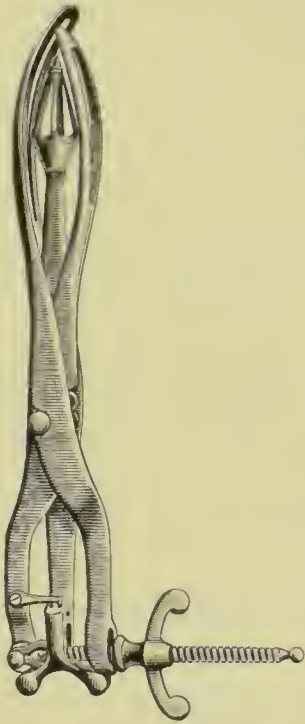


FIG. 12.—Tarnier's basiotribe.

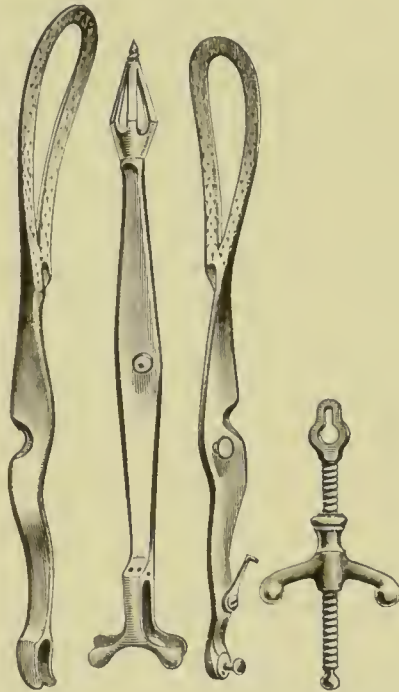


FIG. 13.—Tarnier's basiotribe (separate parts).

renders it inadequate for the delivery of a fetus at full term.

The above cases of extreme pelvic contraction are very rare among American-born women, as stated above.¹

Excess of Amplitude.—An opposite difficulty arises when the pelvis is abnormally large. This deformity

¹ In preparing this chapter on contracted pelvis I have availed myself of the valuable treatment of this deformity by Cazeaux, Lusk, and other modern authorities.

exposes the woman to all the dangers which may be caused by a too-rapid delivery. The child, urged along by the energetic and repeated contractions of the womb, and not encountering a due degree of resistance on the part of the straits, speedily reaches the perineum and tears its way through, because the latter has not yet had time to become distended. The expulsion of the fetus may take place unexpectedly or while the woman is in the erect position, wherever she happens to be. The child is then exposed to a fall to the floor, and there may take place a violent separation of the placenta, a rupture of the cord, or an inversion of the womb; a dangerous post-partum hemorrhage may also be the consequence. This rapid delivery may happen while the woman is asleep, as reported by Dr. T. L. Papin. The first intimation the woman had of her delivery was when the child began to kick against her legs.

Treatment.—The patient should be restrained from bearing down, and be made to lie on her side, as suggested by Naegele, because the effects of her expulsive efforts are thus diminished; the head of the child should be pushed back by the hand and kept from advancing; and the forceps should be applied, this pressure effectually checking the progress of the head. If quickly applied, the forceps renders the obstetrician master of the situation, as the descent of the child can absolutely be restrained.

Bony Tumors.—Some of the obstacles to labor are rarely met with, such as *bony tumors of the pelvis*. When large, they constitute one of the most serious difficulties in the practice of midwifery. They can always be recognized by the touch. They are extremely

numerous and varied: some of them are of the nature of an exostosis, an osteosteoma, or an osteosarcoma, or are caused by consolidated fractures, or are formed by the head of the femur traversing the bottom of a carious and perforated acetabulum and projecting into the pelvic cavity.

The treatment of all these various deformities is the one applied to the varieties of contracted pelves above enumerated.

Adhesions or Atresia of the Vulva.—This abnormality, which consists of unyielding cicatricial tissue, may cause difficulty in labor, forcing the head backward injuriously on the recto-vaginal septum and perineum.

The treatment consists in incising these cicatricial bands with a blunt-pointed bistoury and the use of the forceps.

Persistence of the Hymen.—A persistence of the hymen does not always prevent conception, for in several reported cases it had to be divided, or even removed, in order to make a free passage for the child. Some authors relate instances of pregnant women in whom a second or a third hymen was found at some distance above the first. The late Dr. John Barnes of St. Louis reported a case in which he had to excise the membrane freely in order to liberate the child's head. Again, this membrane has persisted after the delivery, as reported by Meckel. Tolberg reports that a woman after having expelled a fetus of five months, surrounded by all its membranes, still preserved her hymen intact, circular and firm. There is here a delicate medico-legal point, for the medical expert cannot always decide that the woman did not have a child when the hymen is found in the above condition of integrity.

Playfair remarks that some women are born without a hymen, and some have had it ruptured by an accident, such as a fall, etc., and that some prostitutes are found with a virgin hymen; therefore the absence of a hymen is not always a proof of unchastity or of parturition.

Atresia of the Vagina.—This canal may be so contracted as hardly to admit the introduction of the little finger, and yet become in the progress of the labor sufficiently expanded to give passage to a child of the normal size. The labor in this case will be long and painful, and may finally require operative assistance. This vaginal stenosis is caused by inflammatory processes, frequently due to diphtheria, scarlatina, typhoid fever, or syphilis; also to the unskilful use of instruments in some previous labor, or to the use of strong caustic injections.

The various obstacles to labor just studied are, however, more frequently overcome by the efforts of nature alone, but may under certain circumstances necessitate artificial assistance.

Notwithstanding the strongest uterine contractions, the head of the child may remain for several hours without advancing a line. The uterus struggles energetically for a time against the obstacle, but in vain, and after some time the uterine action grows weaker, becomes exhausted, and finally disappears altogether. To reawaken uterine action the patient should be made to walk about the chamber, the abdomen should be rubbed and the cervix titillated, avoiding the administration of ergot, the tetanizing effect of which may cause the death of the child or rupture of the uterus, as reported by Hodge. In case of failure by these means the forceps should be used without waiting even an hour.

Rupture of the Perineum.—The difficulty caused by

a resistant perineum will frequently produce a rupture which may be either *incomplete*, *central*, or *complete*. The *incomplete*, beginning at the vulva, does not involve the sphincter of the anus. The rupture is *central* when it occurs between the vulva and the anus, without involving either of those openings; and *complete* when the vulva, perineum, and sphincter are all torn, together with the vulvo-vaginal partition, to a greater or less extent.

Incomplete lacerations do not require any particular treatment, as they heal spontaneously. The lower limbs ought, however, be kept together for a week by means of a napkin or a bandage tied around the knees, the woman being on her side; cicatrization then sometimes takes place by first intention, and sometimes after supuration. In this case it is not necessary to use any suture; a few touches of nitrate of silver may promote healthy granulation.

In *central* ruptures, when the child's head is forcing a passage through the perineum, all that is necessary is to push back the head with the hand, extending the head as much as possible by pressing the perineum gradually toward the natural opening, and to use the forceps promptly. This instrument succeeded very well in the writer's hands in a similar case; the rent through the perineum promptly retracted and healed without difficulty.

The condition is far more serious in *complete* rupture, which is followed by inability to retain the feces—a deplorable infirmity. It is well, however, to know that a certain number of these cases of complete rupture recover spontaneously by a process well described by Hodge. Cazeaux reports a case, and Huguier more

than twenty cases ; therefore the natural cure cannot be of very rare occurrence. Nevertheless, spontaneous recoveries are far from being the general rule, and then surgical interference becomes a matter of necessity.

Repair of the Perineum.—When perineorrhaphy is to be performed the question arises as to the best time for doing the operation. Dieffenbach was the first to advise the suture immediately after the delivery ; for, as at that time the lacerated surfaces are still bleeding, it is unnecessary to freshen them, and the whole procedure is resolved rather into a simple dressing than a bloody operation, and is painless. Roux and Velpeau, two eminent surgeons, on the contrary, advise waiting until the patient has entirely recovered, and defer operating until after the first menstrual return. Cazeaux endorses this recommendation. Dieffenbach's procedure is the one adopted in America, and generally also in Europe. Experience proves that the immediate repair of the perineum gives the best results.

The art of closing lacerations of considerable extent by sutures deserves to be acquired by every obstetric practitioner (Lusk). The necessary means are contained in every surgical pocket-case, and the diagnosis of the lesion is made by a careful inspection of the genital organs immediately after delivery. The extent of the injury is estimated by including the recto-vaginal septum between the thumb and the index finger.

Lusk says that if the rupture extends to the sphincter ani and involves the entire perineal body, the vagina is left without support, rectocele or cystocele ensues, the uterus sinks downward and becomes displaced backward, and in the end prolapsus is apt to result. If the sphincter ani and the recto-vaginal wall are involved, inability to

restrain the bowels adds to the discomfort of the patient. This sequence, so familiar to gynecologists in chronic cases, forms an urgent plea for the resort to surgical means to repair the injury immediately or within a few hours after delivery.

Lusk adds: "To the immediate operation there is no valid objection. It is not difficult, it is not extremely painful, and its performance as a rule diminishes the risks of infection and shortens the puerperal period. It is true that the object aimed at may not always be attained. In private practice, however, failure is the exception. The argument that the operation is in itself a confession does not deserve discussion."

Technique of the Operation.—For its performance the patient should be made to lie upon her back, with her hips well over the edge of the bed. Two assistants to hold the knees are of great convenience. In operations requiring the introduction of not more than three or four sutures anesthesia may be dispensed with; in lengthy operations, such as are necessitated by lacerations extending up the posterior vaginal wall, ether should be given instead of chloroform: its administration should be entrusted only to an experienced person. It should not be forgotten that anesthesia *after* labor calls for the exercise of extreme caution, while it is comparatively safe *during* labor.

The wound should be prepared by carefully washing away blood and clots with warm carbolized water and by removing shreddy portions with scissors. For lacerations not extending through the sphincter ani the writer uses a Peaslee needle, which is furnished with an eye at the point and is set in a wooden handle. It possesses considerable strength, a quality of no mean advantage

in making the circuit of the redundant tissues with which we have to deal after labor. The writer uses the silver suture, and after repeated trials he has not been able to convince himself that it can equally well be replaced by silk.

The first suture should be passed just in front of the anus. It should be introduced and brought out about half an inch from the ruptured borders. The other sutures should follow at from one-third to one-half inch intervals. Each suture should make the entire circuit of the wound. This course can readily be accomplished by guiding the point of the needle through the tissue of the perineal body with two fingers in the anus and with the thumb upon the vaginal surface. To secure a stronger hold for the last suture the needle should be made to enter the vagina above the upper angle of the rent, and the wire should be made to traverse a portion of undenuded tissue before completing the circuit. In closing the wound great pains must be taken not to twist the sutures too tightly, as in that case they are apt either to cut out or to produce sloughing.

Sometimes, in rents extending through the sphincter ani and the recto-vaginal septum, the simple perineal sutures will effect a satisfactory union. As a rule, it is desirable to adjust the edges with great care, first closing the rent upon the rectal side, then bringing together the split in the mucous membrane upon the vaginal side with transverse sutures, and finally bringing the lower borders of the perineum together by a separate operation (Garrigues). This constitutes the so-called "triangular suture" of Simon. It requires fine needles, a needle-holder, an adjuster, a wire-twister, and, in fact, all the paraphernalia of the gynecologist. The disgust-

ing condition of a patient with laceration through the recto-vaginal septum, where the healing process has been the result of granulation, justifies the attempt to secure immediate union.

The requirements in the way of after-treatment are very simple. The urine should be drawn every four to six hours with a catheter until the patient is able to pass her water spontaneously; the bowels should be kept open with salines, and the knees should be tied loosely, to remind the woman of the desirability of keeping them in contact. A little opium may be given if the pain experienced is considerable. The perineal sutures should be kept a week *in situ*. Many promising cases are spoiled by removing the sutures too early. The vaginal sutures may be allowed to remain until the external union is sufficiently solid to permit the introduction of a speculum. Catgut sutures for the rectum are to be preferred where they can be obtained, as they obviate the necessity of future removal.

For the more superficial lacerations of the perineum the *serres fines*, invented by Vidal de Cassis and extensively used in Vienna, have been warmly advocated in the United States by Mann and Garrigues. "My own experience with them has not been fortunate," says Lusk; so also says Cazeaux. They may be tried, however.

CHAPTER V.

VARIOUS OTHER DIFFICULTIES IN LABOR.

Edema of the Labia Externa.—This obstacle to delivery is not uncommon. It is caused by prolonged pressure of the presenting part, and may much embarrass the practitioner, especially in a case of eclampsia. When the edematous swelling is very large it should be freely punctured with a lancet, in order to allow the escape of the serum which constitutes its contents, and thus prevent rupture and gangrene.

Sanguineous Tumor or Thrombus of the Vulva and Vagina.—The thrombus consists of an effusion of blood into the soft parts of the lesser pelvis or into the vulva, and it extends sometimes above the superior strait, and even quite high into the abdomen, says Tarnier. This effusion may take place either during or soon after labor, and rarely in gestation.

The diagnosis of these tumors is generally quite easy. Their sudden appearance, their rapid development, their hardness when the blood is simply infiltrated and fluctuation when it is collected, the violent pain they give rise to, and the bluish discoloration of the skin, are always sufficient to detect them by. Nevertheless, they have sometimes been confounded with certain other tumefactions, such as simple varicosities, inversion of the vagina, descent or inversion of the womb, and with the vaginal hernia formed either by the intestine, the omentum, or the bladder. A sanguineous tumor may acquire considerable size, abstracting sufficient blood to produce syncope.

The prognosis is usually unfavorable; thus, of 62 cases

reported by Dr. Deneux, 22 women died, either during gestation or during or after delivery; with one exception all the children of these 22 women were likewise lost. The profuse hemorrhage is the most frequent cause of the patient's death, though the latter may also be occasioned by the gangrene and suppuration which often follow the primary symptoms.

The gravity of this prognosis is confirmed by Blot, who lost 5 women out of 19 cases. All the children of the women who died were stillborn. Winckel reported 6 deaths in 55 cases; Barker, 2 deaths in 22 cases; and Scanzoni, 1 death in 15 cases. Lusk, however, remarks that statistics like these are apt to give rise to a misleading impression, and that thrombosis, *per se*, is rarely a dangerous complication, the cause of death being generally from gangrene caused by septic infection, and, in rare cases, from the profuse and rapid hemorrhage following the rupture of the thrombus, especially when intrapelvic. These tumors may terminate either by resolution, suppuration, rupture, or gangrene.

Treatment of Thrombosis.—The treatment necessarily varies according to the size of the tumor, the pain it occasions, and the time of its manifestation. If the patient is in labor when the tumor is developed, and the latter be large enough seriously to impede the passage of the head, the effused blood should evidently be evacuated by a free incision (about 3 inches in length) made at the most dependent part of the swelling. If this operation be performed some time before the head engages in the excavation, it would be advisable, after having emptied the sac, to make use of the tampon in order to prevent hemorrhage; but if, on the contrary, the tumor is only opened when the head is fully engaged,

the application of the tampon may be dispensed with, for the child's head will sufficiently compress the divided vessels to prevent the further discharge of blood.

The incision should be *immediate* if the tumor is large enough to fill a great part of the excavation and seems capable of obstructing the discharge of the lochia. If, however, the tumor is small—being no larger, for example, than an egg—if there is only slight pain, and the extravasation does not seem to increase, *no incision* is called for, as absorption may take place.

At what part of the tumor should the incision be made? Most authors agree that the incision should be made externally—that is, through the integuments. “I adopt this method,” says Cazeaux, “but upon one condition—namely, that it shall be possible, which is not always the case; but when the tumor is situated in the greater or lesser labia it presents two surfaces, one mucous and the other cutaneous; and unless there exists a very thin and altered point, which of itself deprives the surgeon of the power of choosing, it may be incised either outwardly or inwardly.”

But the thrombus is not always situated so low down. It may be altogether within the excavation, and be limited outwardly by the bony walls of the pelvis, thus presenting none other than a mucous surface to the instrument. Therefore, should incision be deemed necessary, it can only be practised upon the walls of the vagina. If the integuments upon any point of the tumor are exceedingly thin or are affected with gangrene, the incision should be through the affected parts.

Early recognition of the accident is very desirable, and the forceps should be applied and the head extracted as speedily as possible. “The exciting cause of the acci-

dent is the arrest of the circulation by the mechanical pressure of the presenting part of the fetus. The sooner the pressure is removed, the sooner the danger will be over and the less will be the injury to the parts" (Fordyce Barker).

After incision the filling of the cavity with lint soaked in subsulphate or perchlorid-of-iron solutions should be avoided, unless other procedures have proved ineffective in checking the hemorrhage, as these preparations would probably excite suppuration.

Tedious Labor.—Women in the great majority of cases are able to deliver themselves; the less done by the accoucheur the better. But nature is not always equal to the task of delivery, and assistance must be rendered under certain circumstances.

When the woman has been twenty-four hours or longer in labor the accoucheur must seek for the cause of this delay. The first stage, according to Churchill, may be prolonged without danger; the second, on the contrary, cannot go beyond certain limits without greatly endangering the health of the patient and oftentimes the life of the child. It is found that the latter is lost at least one time in four when the head remains in the excavation longer than seven or eight hours *after* the complete dilatation of the os uteri and the rupture of the bag of waters, while the child nearly always survives when the first period is prolonged even to forty, fifty, or sixty hours or more *before* rupture. The reader may be referred to Churchill's interesting statistics on this important subject.

Among the *causes* that frequently may retard the delivery may be mentioned the condition in which the pains, after having been normal, slacken, become very

irregular, and cease for a time, losing their expulsive force. The term "tedious labor," used by English authors, well designates this form of labor.

Treatment.—In order to rouse the contractile power of the uterus, which seems to be lost in cases of tedious labor, the patient should be advised to rise and walk for some time about the chamber, assisted by her nurse; if the contractions continue inactive, the forceps should be applied if there be sufficient dilatation or if the os be dilatable.

Suspension of the Pains.—Any vivid mental impression, any unexpected news or sharp discussion, or any sudden fright, may suspend the labor-pains, as in a case related by Dewees in which the house of the patient took fire and her active labor was arrested for twenty-four hours. The violent cramps produced by the pressure of the child's head on the sacral nerves may arrest the uterine contractions, as observed by Meigs, who on several occasions had to use the forceps to relieve the woman by moving the child's head away from the compressed nerves.

Treatment.—Chloroform, preceded by a hypodermatic injection of half a grain of morphin and the prompt application of the forceps, as stated above, is the treatment clearly indicated to relieve the cramps. A full bladder should be emptied by the catheter, and the rectum by an enema, as their fulness is also a cause of tedious labor. Venesection should be resorted to if the patient present symptoms of general plethora, such as redness of the face, headache, throbbing of the carotids, dimness of vision, tinnitus aurium, and unusual force and fulness of the pulse, all these symptoms indicating the possible occurrence of an attack of eclampsia. In the pro-

tracted first stage Lusk recommends the dissecting up of the adhesions of the membranes with the index finger, and, in case the membranes are ruptured, the introduction of an aseptic bougie into the uterus, with the use of Barnes' dilating bags and the warm douche. Fordyce Barker and Albert Smith strongly recommend quinin as a reliable oxytocic. The writer's rule for years has been to give at the beginning of *every* labor 10 grains of quinin every two hours until 30 grains have been taken, and *after* the labor 5 grains three times a day for one week, together with 30 drops of the fluid extract of ergot for five days, in order to guard against septicemia, promote involution of the uterus, and prevent after-pains by causing the expulsion of the remaining clots and shreds of membrane. Ergot, remember, should never be given *during* labor, and only *after* the child, the placenta, and the membranes have been expelled. Hodge, as stated above, never saw a case of ruptured uterus that had not been preceded by the administration of ergot during the first stage. Churchill states that ergot will invariably kill the child if it be not born within two hours after the administration of the drug. It may also cause an hour-glass contraction of the lower portion of the uterus, incarcerating the placenta and rendering its extraction difficult. In hydramnion, retarding labor and threatening asphyxia, the membranes should be ruptured high up, so as to allow the *partial* escape of the amniotic fluid; there will then be less risk of the child's extremities and of the cord being washed out by the sudden gush of the waters. This rule of puncturing the membranes high up is also to be followed, if it be necessary to puncture them at all, whenever they protrude and the head is still high.

Powerless Labor.—The causes of this difficulty may

be—deformities of the pelvis, some abnormality of the parturient canal, malpresentations or malpositions of the child, etc. All these must be ascertained and corrected. But it frequently happens that when these causes are absent the want of progress in the labor is due simply to irregularity of the pains, the result of unsymmetric contractions of the womb, which does not present its normal shape, but exhibits instead various bosses and inequalities felt by the hand, the pains, although extremely violent, having no influence in advancing the child. This condition, which constitutes a sort of *tetanus of the womb*, is produced frequently by the spasmodic contraction of the ring of Bandl, which can distinctly be felt through the abdominal walls. During the paroxysm of the pains the presenting part seems, at times, to advance a little, but this progression is not kept up, though the pains continue strong. The patient may be in this distressing condition many hours, and her labor has truly become powerless.

Treatment.—Where the woman is plethoric, the pulse full, and the face red and flushed, venesection should be practised; but if the patient is feeble and nervous, no bleeding should be done, but an enema of 40 grains of chloral, with 1 teaspoonful of laudanum in 4 ounces of mucilage or of milk, should be given, or a hypodermatic in the arm of half a grain of morphin. The above measures are to be repeated in two hours if the patient is not relieved. Chloroform, instead, might be inhaled with good effect, as has been reported; but the writer prefers the above injection, which is more certain and safer. As soon as the dilatation is sufficient the forceps or version should be resorted to.

Precipitate Labor.—As an instance of precipitate and

unconscious delivery the writer relates the following instance, which occurred while he was serving as coroner : A young servant-girl, seduced and deserted, was attacked in the night with severe colicky pains. Thinking that an action of the bowels would give relief, she walked to an old-fashioned water-closet, and while straining there was delivered of a live child, which fell down the privy-vault from a height of about 20 feet to the hard pavement below. She walked back to her room, followed by a trail of blood. In the morning she was discovered by the mistress of the house, and a doctor was sent for, who delivered the placenta, the cord having been ruptured by the fall of the child, which was discovered dead, its skull having been fractured by the accident. The poor girl was accused of infanticide, and was tried before the coroner's jury, to whom were explained the facts connected with cases of precipitate and unconscious labor. The girl was found "not guilty." This case illustrates the desirability of preventing women from getting up while straining in the expulsive period of labor.

Edema of the Anterior Lip.—It sometimes happens that during the expulsive pains an edematous swelling takes place between the fetal head and the symphysis. This is easily corrected by pushing this swelling over the head with the fingers, and by keeping the fingers there until the return of the pains. This little manœuvre will materially assist delivery and greatly relieve the woman suffering. But this, as it were, physiological edema is not to be confounded with the pathological tumefaction next to be described.

Tumefaction of the Anterior Lip.—It not unfrequently happens during a severe labor, before complete

dilatation of the os uteri, that the anterior lip becomes compressed between the child's head and the symphysis pubis, this compression causing a considerable tumefaction (sometimes $1\frac{1}{4}$ inches thick), which is forced down within easy reach of the finger, as observed by Blot and Naegele, who report cases where this tumor was cylindrical and projected out four fingers' breadth; it was 2 inches broad at its base, very irregular, resistant, and of a wine-like color. This tumefaction, when considerable, is an obstacle to the delivery of the child, which may, however, be born unassisted. But if the tumor be very considerable, tense and black, threatening gangrene, the procedure of Lever should be followed, of making a number of punctures for the purpose of evacuating the infiltrated liquids and diminishing the volume of the swelling.

Montgomery thinks that this condition might be mistaken for a case of insertion of the placenta upon the neck. This error, however, is easily avoided by remembering that the finger can never be made to penetrate between the tumor and the internal surface of the uterus. The forceps may occasionally be required in these cases.

Thrombus of the Lips and Neck of the Uterus.—The infiltration mentioned above may be the first degree of a much more serious accident, for the infiltrated blood, by separating the meshes of the tissues of the neck, may collect in a cavity which, by opening afterward in the same way as the thrombus above described, may give rise to fatal hemorrhage on account of the bursting of the walls of the cavity. The hemorrhage may take place during the labor itself, though far more frequently it does not appear until some days after delivery. This accident is happily rare; Montgomery reports a fatal case.

Treatment.—The thorough packing of the obstetric canal with iodoform gauze is certainly the most useful measure that can be employed.

CHAPTER VI.

OBSTACLES AT THE NECK OF THE UTERUS.

Agglutination of the external uterine orifice is a rare accident, though, as Naegele, from whose treatise many of the following details are taken, remarks, this rarity may be only apparent, owing to the fact that the various degrees of agglutination have escaped the notice of the physician, the powers of nature alone triumphing over the accident in most cases.

Its existence may be suspected when the inferior uterine segment descends low down in the excavation at the beginning of labor and presents no trace of an orifice, or when the latter presents as a fold or a hollow which is slightly depressed at its centre, and which very often does not correspond with the pelvic axis. The middle of this little depression is usually occupied by a filamentous web, some fleshy tissue, or a cellular network, in the centre of which a small narrow opening is found; sometimes the lips are held together by a tenacious mucus. As the contractions become more energetic the lower segment of the womb is forced into the excavation, and becomes so thin that at the first exploration the finger appears to be separated from the head by the membranes alone. At the same time, notwith-

standing the strength of the pains, the uterine orifice is not only tightly closed, but even seems to ascend somewhat and to be carried toward one side. The orifice may open spontaneously under the pressure of the energetic contractions, but if it resists and the accoucheur does not early recognize the source of the difficulty, there may result a rupture of the womb or a paralysis which is no less dangerous.

The exudate gluing together the lips of the external os may be compared, says Naegele, to the pseudo-membranes of diphtheria, of pleurisy, or of peritonitis, and the agglutination may arise from a cervicitis, or frequently from the injudicious use of strong caustics after impregnation.

In an interesting case which the writer saw a few years ago in consultation, this accident had been caused by caustics applied during pregnancy. The patient was a healthy young primipara, who in England, when four months pregnant, had had her cervix cauterized several times. When seen by the writer it was said that she had been in labor twenty-four hours; the fetal head was in the excavation and progress had been arrested. The pains were most powerful, and the writer feared every moment rupture of the uterus. No opening could be detected at the place where the os should have been. However, by further examination the writer discovered a shallow depression at the region of the normal site of the os externum, and by pressing an index finger against this depression, using a rotary movement, he succeeded in breaking up the filamentous web which covered the orifice, and by still enlarging the latter with the other fingers the expansion of the neck was made complete and the child was rapidly born. In case of failure with

the finger alone a metallic catheter should be tried or a crucial incision be made with a bistoury, or, still better, with a pair of curved scissors. The writer was prepared to do this operation, when by a little perseverance he succeeded with the finger alone. From this example we should learn to be very cautious in cauterizing the external orifice of the neck during pregnancy.

Complete and solid atresia of the os, a rare complication, is easily recognized by the existence of a protruding fold which does not open, notwithstanding the most energetic contractions, and which is not in the least modified by them, so that not even a sound can be made to penetrate the cavity of the cervix. If no intervention is practised, there exists great danger of exhaustion or of rupture of the uterus.

The treatment consists in carefully practising vaginal hysterotomy with a convex bistoury covered nearly to its end by a strip of adhesive plaster and directed by two fingers. When the incision is thought deep enough, it is lengthened with a blunt-pointed bistoury. Several such crucial or stellate incisions are made, leaving the completion of the opening to the natural expellent forces, and in their absence using the forceps. Very little hemorrhage follows these incisions. Simpson, Martin, and Depaul have reported several instructive cases of this nature.

Vaginal Stenosis (Colpo-stenosis).—This anomaly is either congenital or accidental. *Congenital* narrowing of the vagina, independent of any morbid process, is often observed, and is generally overcome by the natural expellent forces in labor. However, the stenosis may have been caused by some one of the exanthematous diseases, such as scarlatina, or by diphtheria, in childhood. The

stenosis may also be the result of unwise applications of caustics to the genital tract, as noticed above, and may be the source of grave difficulty during parturition, and even require the knife of the surgeon to create a passage for the child, especially when cicatricial bands, the result of the inflammation, run transversely or longitudinally in the vagina. In a case seen by the writer these rows of cicatricial bands had to be cut with a blunt-pointed bistoury before the forceps could be applied.

Abnormal Obliquity of the Uterus.—Before and at the beginning of labor the uterine orifice is ordinarily directed backward and a little to the left, while the fundus is to be found forward and to the right. But sometimes the orifice is so high that the finger can hardly reach it. On one occasion, quoted by Cazeaux, the anterior segment of the anteverted uterus, covering the head of the child, was so low and thin that it was mistaken for the head out of the uterus, and the forceps was ruthlessly applied *externally* to the womb, thus separating the vagina from this organ. Through a similar mistake midwives will sometimes scratch out the lower segment of the anteverted uterus with the finger-nail, thinking it to be the membrane protruding through the os.

Treatment.—At the beginning of labor the patient should be made to lie down, and forbidden all expulsive efforts, in order to avoid premature rupture of the membranes; no attempt should be made, as formerly advised, to hook the anterior lip with the fingers and draw it forward. If the excessive obliquity constitutes a pendulous belly (*ventre en besace*), an assistant should raise the anteverted uterus during a pain; or a long towel passed around the belly and secured behind the patient's neck

would materially assist in correcting this excessive obliquity. Labors in these instances are very long, lasting sometimes several days, as in a case attended by the writer, where, after three days of labor, he at last had to apply the forceps, which operation was attended with some difficulty.

Rigidity and Spasmodic Contractions of the Cervix.

—Rigidity is a passive force by which the fibres of the orifice resist the dilatation they have to undergo. Spasmodic contraction is an active force by which the fibres contract and diminish the size of the opening previously exhibited by the mouth of the womb.

Rigidity.—The labor continues without dilatation of the orifice, and the woman becomes exhausted with her fruitless efforts at expulsion. According to Dewees, this resistance of the cervix uteri is particularly apt to be met with in very young women or in aged primiparæ. Rigidity of the os should be suspected, says Madame Lachapelle, when the patient complains of excessive pains in the loins.

Treatment.—Prolonged warm baths and enemata of very warm water, also venesection in extreme cases, are to be recommended. A long towel placed under the patient's loins, on which towel she should be raised during a pain, will give relief to the severe pain in the loins. However, the most reliable treatment—which the writer has adopted for years—is to give the patient an enema of from 40 to 60 grains of chloral, together with $\frac{1}{2}$ or 1 teaspoonful of laudanum in 4 ounces of starch-water, repeated every four hours. The retention of this enema in the bowel is secured by firmly pressing on the anus for fifteen minutes the end of a towel wrung out of very cold water or ice-water. This treatment will soon

succeed in dilating the rigid or spastic cervix, and will much relieve the patient. The warm-water treatment first mentioned is much preferable to chloroform, the administration of which should not be begun early in labor, as the patient then becomes clamorous for it and it is hard to resist her entreaties, and also because too long an administration of chloroform is apt to produce post-partum hemorrhage, besides its other dangers, especially asphyxia of the child from venosity. A hypodermatic of a $\frac{1}{2}$ grain of morphin may be used in the absence of chloral, and be repeated every two hours if necessary. A pellet of good extract of belladonna, placed by the index finger in the os, will occasionally succeed well in producing dilatation of the cervix, but oftener it fails; it may, however, be tried. Dubois has great faith in its efficacy.

Spasmodic contractions of the neck of the uterus will also be relieved by the above measures; but if they fail, and some accident calls for prompt action, multiple incisions around the neck should be practised. Generally two or three incisions from $\frac{1}{4}$ to $\frac{1}{2}$ inch in extent will be sufficient, using for this small operation a blunt-pointed bistoury or a pair of angular scissors.

Spasmodic Contractions of the Body of the Uterus.—The portion of the uterine walls that corresponds with the internal os in the non-gravid state retracts forcibly on the neck of the child even before the head has cleared the external orifice, so that the head, being retained in the portion of the organ that appertains to the neck after delivery, can advance no farther. This internal contraction takes place in cases in which the waters escaped some time before, and it evidently results, as Dewees has remarked, from the double tendency of the

womb to regain its primitive form and to accommodate itself to the shape of the parts contained within its cavity. These spasmodic contractions vary in intensity and duration. When moderate, they often alternate with normal pains, but the contraction is irregular and is felt in various locations of the uterus, which feels uneven, nodular, and excessively painful. The contracted lower segment of the uterus feels as if bound by a metallic cord.

In a more pronounced degree there is no cessation of the painful contractions; the uterus is *tetanized*, and somewhere between the os internum and the fundus of the organ there exists a constricted portion, which contracts beyond measure in comparison with the other parts of the uterus, either below or above the point of strangulation, that are uncontracted or relaxed.

Loeffler detailed a case which is of some importance from a medico-legal point of view. The uterine stricture had produced on the body of the still-born child a band of dark coloration three fingers wide. One might very well suspect that this furrow had been caused by external violence at the time of labor.

It is this *stricture* of the lower segment of the uterus that Bandl claims to have discovered, but it had been graphically described by Naegele long before Bandl's time. The womb appears as if strangulated about its middle by a circle, which is easily felt when the whole hand has to be introduced in the performance of version or in removing the placenta when incarcerated above this stricture, which then forms at this point an hour-glass contraction. Sometimes the diagnosis is very difficult, especially when the exploring finger cannot reach the stricture on account of the position of the womb, which may not be high enough for the accoucheur to

recognize the stricture by abdominal palpation. On certain occasions the latter will show it plainly.

Bandl has shown that nearly all ruptures of the uterus begin in the attenuated lower segment between the stricture or ring and the os internum. The lower segment is stretched, and therefore attenuated by the ovum, thus favoring the production of rupture.

The following are important diagnostic signs: When, notwithstanding a careful examination, no disproportion is revealed between the fetus and the pelvis, yet the presenting part does not advance, the head remaining immovable; or when the part descends a little during a pain and reascends in the interval, without, however, being impacted, as is shown by the fact that the finger can easily give it some motion; or when one can recognize that during a contraction the head does not press on the uterine orifice, thus proving that the obstacle is not at this point, but that it has its seat in a more elevated part of the uterus,—these are very important diagnostic signs. Under these conditions, if the forceps be applied, the blades easily enter the orifice, but in pushing them higher there is met a most resistant obstacle, which is surmounted only by giving extreme pain to the patient. If the head is low enough for the application of the forceps, the greatest difficulty is experienced in efforts at extraction, and by placing one hand over the uterus this organ is distinctly felt to be drawn down at every traction. When version is attempted the introduction of the hand through the stricture is almost impossible. This introduction of the hand is one of the greatest difficulties to be met with in the performance of version, as every practitioner knows.

If this uterine spasm is of the most aggravated form,

it causes during the contractions excruciating suffering which the patient can hardly bear. She is extremely agitated, and asks for immediate relief. The respiration is rapid and the temperature becomes very high. These agonizing pains are also the cause of various reflex manifestations, and even of eclampsia.

The permanent spasm of the uterus is particularly dangerous for the fetus, on account of the arrest of circulation and compression of the umbilical cord. The danger to the woman is in proportion to the intensity and duration of the spasmodic contraction, and this renders difficult and painful all obstetric operations.

The treatment is that previously recommended for *rigidity* of the cervix. The most reliable means are chloral and laudanum enemata, hypodermatics of morphia, well named the *solamen parturientium*, and in aggravated cases venesection, especially when version has to be performed. The latter measure was strongly recommended by the sagacious Dewees, and is again followed by the most recent authorities since the "lost art" has been found. Dewees used to bleed the patient in the sitting position, *ad deliquium animæ*, as the best sedative and antispasmodic known. In case the above measures fail, Stoltz recommends the use of the succinate of ammonia, in 15-grain doses every three hours, as a reliable remedy.

CHAPTER VII.

UTERINE TUMORS AND CERTAIN OTHER CONDITIONS COMPLICATING LABOR.

Polypi and Myomata.—As the scope of this work is to consider only the obstacles and accidents that may present in labor, the subject of uterine myomata will not be treated here *in extenso*, as it properly belongs to Gynecology. The myomata may be subperitoneal, interstitial, or submucous, and when considerable they generally prevent conception or interrupt pregnancy in its early stage. But fibrous tumors or polypi of the neck may allow pregnancy to continue to its full term, and then become a serious impediment to labor.

These tumors vary in size. Sometimes they are large enough to fill up the excavation, but really have their origin or seat in the proper tissue of the neck; others that arise from the body of the womb, to which they still adhere by a long pedicle, are found hanging into and obstructing the cervix. The latter tumors are the polypi proper. The fibrous tumors of the neck are occasionally large enough to occupy entirely the pelvic excavation, and are sometimes as voluminous as the head of a fetus at term.

If the tumor, situated at the neck or a little above it, is of moderate size, the labor takes place without particular complications, as these tumors often become softer toward the end of pregnancy, and during labor are compressed and flattened by the head of the fetus. Very large fibromata, however, may render labor not only difficult, but sometimes even impossible (Fig. 14).

Treatment.—When these fibroids are small, one may

wait to see what will be done by the natural expellent forces, which in this, as in other cases, accomplish sometimes surprising results. If the prolongation of the labor becomes dangerous for the mother or the child, the use

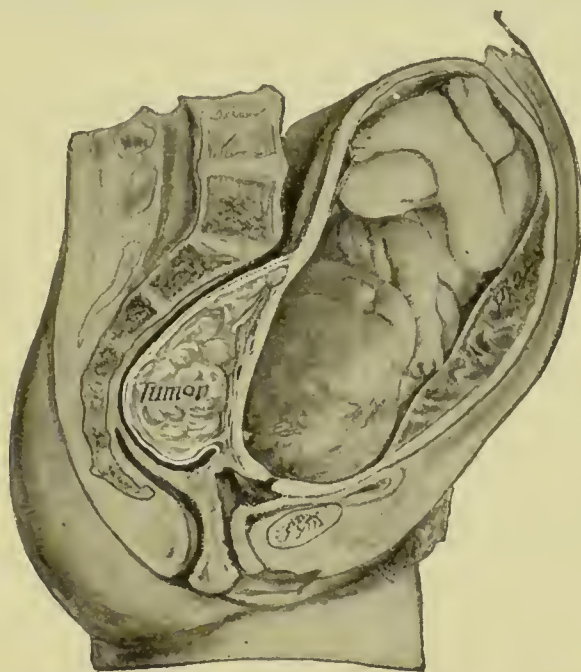


FIG. 14.—Small fibroid, past which the child was extracted. The tumor became gangrenous and the woman died (redrawn from Simpson).

of the forceps, version, Cesarean section, or symphyseotomy is called for. If the child is dead, perforation can be resorted to. If the fibroid presents some mobility, attempts should be made to push it back into the pelvis or to draw it out of the vagina. But if the genital canal is completely obstructed, no resource is left but the Cesarean operation or symphyseotomy, even if the child be dead, as craniotomy is then impossible on account of the complete obstruction existing.

Spiegelberg describes a peculiar tumor that he calls an "incarcerated, subserous uterine myoma," which orig-

inates most frequently in the cervical tissues, and, extending downward, becomes recto-vaginal, more or less completely occupying the pelvic cavity, and offering, when large, an insurmountable obstacle to parturition.

Tarnier reports a case of this nature which terminated fatally after a very difficult version. A Cesarean section might have saved the patient. The latter operation was made necessary by two large tumors of the Spiegelberg variety in a case recently reported by Dr. Moses Baker (of Stockwell, Indiana), who was successful in saving the mother and the child. Montgomery once performed Cesarean section for such complete obstruction, and Lehmann seven times. In the forcible attempts at pushing back the tumor a rupture of the uterus or a perforation of the bladder may be produced, as in a case reported by Barnes, where a hard fibroma occupied the lower and anterior part of the uterus.

The polypi proper are either of a fibrous or a sarcomatous nature, and frequently, as above stated, they cause a mechanical obstacle to delivery when they protrude through the cervix of the uterus. Those higher and a little above the os internum act, as do the interstitial fibroids, in producing dynamic troubles. However easy may be the diagnosis of polypi when within the reach of the finger, there are not wanting examples when not only midwives, but also experienced physicians, deceived by the shape, the resistance, and the occasional size of such tumors, have mistaken them for the head of the child. Such a mistake can be avoided by embracing the tumor with the whole hand and following it up to within the womb.

Treatment.—If a polypus of moderate size retards labor too long, the forceps or version should be re-

sorted to. When the pedicle of a large polypus can be reached, it should be excised; if too high to be reached, enucleation of the tumor should be performed. In 8 cases collected by Puchelt the labor was very difficult, but it terminated without the intervention of art. In a case reported by F. Ramsbotham a polypus of the size of a goose-egg hung into the vagina. After rupturing the membranes the polypus was driven out by the head of the child. Valerius speaks of a polypus of the size of a child's head that extruded into the genital tract two hours before the end of the labor without opposing the expulsion of the child. The polypus was inserted into the lower segment of the uterus by a very large pedicle, which was ligated.

From the 12 cases reported by Oldham and from the above instances it must be concluded that, if they do not always render labor difficult, polypi may be the cause of grave accidents, best prevented by the removal of the neoplasm.

Carcinoma of the Cervix Uteri.—This is a very dangerous complication in labor. *Cancers* of the womb are almost always of cervical origin and of an epitheliomatous nature (cauliflower excrescences). They originate from both lips of the cervix or around it by a large base; they are soft, nodular, or granular, and they present to the finger a sensation like that of the external surface of the placenta, with which they have occasionally been confounded. Labor in these cases is difficult, long, and painful, especially if the growth is of a scirrhus nature, extending to the body of the uterus, which may rupture. The labor is followed by profuse hemorrhage, which, however, can be controlled. Conception may occur in the early stages of the disease, and gestation

may proceed to its full term, although abortion is of frequent occurrence.

Treatment.—Upon the advent of labor, says Lusk, “if the child be living, the Cesarean section certainly holds out the hope of saving one life, and probably does not increase the peril to which the other is exposed.” The mother’s life is so greatly compromised by the disease with which she is affected that we should not hesitate to sacrifice all for the safety of her infant. However, numerous obstetricians state that labor may be terminated by the natural expellent forces, even when the cancerous growth is considerable. Thus, Fordyce Barker reports that he met with three cases of spontaneous delivery where the cervix was carcinomatous, in all of which cases the mother survived the childbed period. These labors are very long, lasting sometimes several days or even a week, as stated by Madame Lachapelle. Levret, Dugès, and Madame Boivin relate cases where the cancerous tumors were of the size of a fist, yet the labor terminated spontaneously.

Some authors have recommended repeated incisions in the periphery of the cancerous mass, because turning and the application of the forceps, as advised by certain accoucheurs, are evidently only practicable where the bistoury may have previously facilitated the entrance into the womb. By following this course the writer safely delivered with the forceps a woman who had a large cancerous growth of the cervix. She lived for some time afterward, the child being also saved. The example of Schroeder might in some cases be followed. In a case where the child was dead this operator broke away with his hands large masses of the neoplasm, and thus provided a passage of sufficient size to permit the

extraction of the child by version. The patient was discharged on the tenth day, but she died a few days after. It seems to the writer that one of Simon's largest sharp curettes would enable one to perform this work very satisfactorily, with the object of forming a passage through the neoplasm.

Ovarian Tumors.—These tumors frequently complicate pregnancy and are an obstacle to parturition, especially when cystic and of considerable size. When prolapsed into the excavation of the pelvis (Fig. 15) they render the labor difficult and sometimes impossible. They are not necessarily a cause of abortion when of moderate dimensions, unless confined by adhesions to the pelvic cavity, in which case the natural uterine expansion would be interfered with and retroflexion be induced, causing an incarceration of the pregnant uterus. Besides containing liquid, they may degenerate into fibro-cystic, steatomatous, or even malignant forms, their volume being thus increased; or they may be dermoid. These tumors are almost always to be found in the recto-uterine pouch, and their size varies between that of a hen's egg and that of the head of a fetus at term. When situated in the lesser pelvis they may so obstruct the passages that a natural delivery of the child becomes wholly impossible.

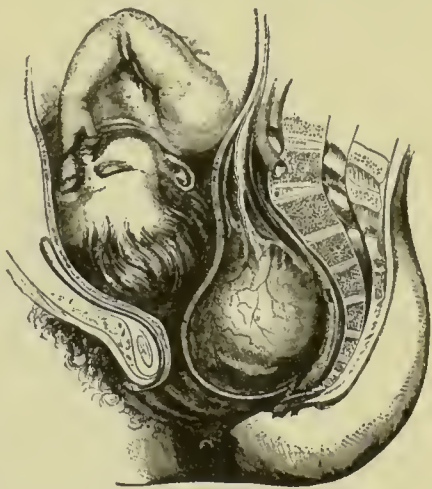


FIG. 15.—Ovarian tumor incarcerated in the pelvis during labor (Dickinson).

In some cases of ovarian dropsy the fluctuation of the tumor is so evident that no possible doubt can exist concerning its character; but in other cases this sensation is not so clearly imparted, though here the smooth and polished surface of the tumor and its rounded form, as compared with the irregularities and the nodules exhibited by cancerous degenerations of this organ, will facilitate the diagnosis. When in doubt an exploration should always be made through both the vagina and the rectum.

Ovarian tumors may be numbered among the most unfortunate complications of labor. In 31 cases recorded by Puchelt, 15 were fatal to the mother and 23 to the child. Playfair reports 57 cases with 13 deaths.

Treatment.—If the ovarian tumor is small, it will not interfere with the birth of the child; if of large size and movable, an attempt should be made to press it above the abdominal strait and support it while the feet of the child are sought after or the forceps is resorted to. If this reposition does not succeed on account of the very considerable size of the tumor or of strong adhesions to neighboring parts, and the labor is too far advanced, one should try an exploratory puncture to ascertain the nature of the tumor. If it be a simple unilocular ovarian cyst, puncture alone may be sufficient to remove the obstacle to parturition; or if there be multiple cysts or the contents be too consistent to escape through the cannula of the trocar, a larger incision should be made. The puncture and incision should be made through the vagina, or, exceptionally, through the rectum when the tumor is placed between it and the sacrum. The time selected for tapping should be during the existence of a pain, when the cyst is rendered tense by pressure.

If the tumor be *solid, fixed*, and so voluminous that it

is an insurmountable obstacle to the birth of the child, even by embryotomy, no choice is left but Cesarean section or the removal of the tumor by laparotomy, the former operation being much less dangerous than the latter. In connection with this subject it should be remembered that Spencer Wells several times removed ovarian tumors during and without jeopardizing the continuance of the pregnancy, and with a successful issue. But these operations were not performed on women in labor, but at various stages of pregnancy.



FIG. 16.—Inguinal hernia containing a gravid womb (Winckel).

Hernia of the Womb (Fig. 16).—This is of very rare occurrence, and may be caused by an accident, extreme relaxation of the anterior ventral walls, pathological separation of the recti muscles, and imperfect cicatrization of the wound after laparotomy or Cesarean section.

A few years ago the writer met with a singular case of this eventration. A negro woman two days after her

confinement was lying in bed, between her drunken husband and the wall. In an awkward attempt to reach a glass of water placed on a chair, for which she had to reach over her husband, she fell from the bed to the floor, and with a loud scream immediately expired. The noise attracted attention, and she was found lying with an immense ventral hernia containing the womb, a mass of intestines, and omentum. Her sudden death was evidently due to syncope following the rapid rush of blood from the brain and the heart to the abdominal vessels, this influx being a consequence of the removal of pressure on the abdominal viscera. This case was one of true eventration, an accident which may also be produced by other causes, such as cattle-horn ripping of pregnant women. Of 11 cases of the latter form of injury reported by Harris, some recovered, the children suffering no injury after escaping from the womb.

Treatment.—A ventral hernia in labor is easily recognized. The tumor may sometimes be raised successfully, and the fetus be returned to the abdomen; if this fail, after testing sufficiently the powers of nature, hysterectomy should be performed, as recommended by very many authorities, if the constricting hernial ring cannot previously be divided.

Prolapsus Uteri.—This accident may take place at the time of labor, and present an enormous tumor hanging between the thighs of the patient and reaching down to the knees (Fig. 17). It is produced by strong bearing-down efforts, with a view of hastening the delivery, before the os uteri is sufficiently dilated, or by allowing the woman to remain walking or standing for a long time. A very roomy pelvis or relaxed muscular fibres of the vagina favor this accident, which may prove a source of

serious difficulties in the progress of the parturition, and even of great danger, for the low position of the womb places it beyond the reach of the influence of the contractions of the abdominal muscles. Under these circumstances the delivery of the child is rendered almost impossible, on account of the induration of the cervix from friction and desiccation, preventing dilatation. Hysterectomy then becomes necessary. But if the accident has occurred recently or only during the labor, the dilatation of the os uteri may sometimes be effected spontaneously.



FIG. 17.—Partial prolapse of the womb in labor (Wagner).

All attempts at reduction would be dangerous during the labor. Dilatation of the os should be favored as much as possible by suitable means, and, if necessary, several incisions of the indurated cervix should be practised in order to prevent its laceration. The expulsion of the placenta must be artificially produced, as evidently we cannot trust to nature for its delivery.

Some years ago a woman presented herself at the clinic in a singular condition. Her womb was completely prolapsed and reached as low as her knees; the vagina was everted, and constricted above the womb.

This patient was then seven months pregnant, and no attempt was made at that time at repositing the organ. She went on to her eighth month, when she was spontaneously delivered of a living child. Afterward the writer learned from her former physician that this accident had happened to her twice before, always under the same circumstances and with the same results. This woman had an extraordinarily roomy pelvis. Chopart relates a very similar case.

Tumors of the Rectum.—Unless a pregnant woman carefully avoids constipation of the bowels, especially toward the end of pregnancy, such an accumulation of feces may take place in the rectum as to render labor very difficult, or even impossible, by obstructing the passage the child has to traverse. In several of the cases reported, injections into the bowels could not be made, and laxatives given by the mouth were ineffectual. For instance, Guillemot says : “ We were constrained before delivering her to extract all the excrements which distended the large bowel ;” and Lauverjat likewise remarks : “ I introduced my finger into the vagina, and pressed on the feces with the view of diminishing their solidity ; I then gave two injections, which soon emptied the intestine. The pains, which had been completely suspended for six hours, reappeared, and the labor was terminated in less than fifteen minutes.” Under the circumstances nothing better could be done than to follow the example of these practitioners. However, a very effectual enema could be prepared by mixing 4 ounces of glycerin in a quart of warm soapsuds, and injecting this into the bowel with a long rectal tube above and behind the uterus. It must be remarked that constipation is a habit with many women, and generally results from neglect.

Scirrhus of the Rectum.—Dr. Lever relates having met with a case where the labor was rendered difficult by the presence of a cancerous tumor situated 3 inches above the anus. But cancerous tumors, says Cazeaux, rarely acquire a large size, and the application of the forceps would nearly always prove sufficient to overcome such obstacles. If not successful, surgical interference may become necessary. Dr. Matthews of Louisville, in his excellent treatise on *Diseases of the Rectum*, reports cases where the cancerous growth was large enough to prove a serious obstacle to labor, and had to be removed by the knife and curette.

Tumors of the Bladder.—True hernia of the bladder, or cystocele (Fig. 18), may be due to the pressure of the child's head transmitted through the inferior part of the womb. The patient has a feeling of weight or fulness in the pelvis and a dragging sensation about the umbilicus, with a constant and painful desire to urinate. The cystocele is occasionally quite large; it may be replaced by pressure, and can generally be emptied with the catheter by directing the concavity of the instrument downward, so as to plunge its beak into the liquid contained in the cavity of the tumor. If it is found impossible to introduce the catheter, and the bladder is threatened with rupture on account of its enormous distention, "I know of no other resource,"



FIG. 18.—Cystocele obstructing labor (Dickinson).

says Cazeaux, "than to puncture the organ with a very delicate trocar."

Serious mistakes have been made in cases of this kind by confounding cystocele with other bodies. Dr. Merriman speaks of a surgeon who, supposing he had to treat a case of hydrocephalic head, thrust a sharp instrument into the bladder. A similar mistake, according to Hamilton, was committed by another practitioner, who imagined he was opening the bag of waters.

Cancer of the Bladder.—The vesical walls when attacked by a cancerous growth may form a tumor in the excavation large enough to obstruct the course of parturition. Cases of this rare affection are reported by Puchelt and others.

As to its *treatment*, this tumor evidently presents similar indications to those of the other solid tumors before described.

Vesical Calculi.—Instances of a stone in the bladder descending into the excavation, and thereby obstructing the free passage of the head, are not very unusual. The calculi vary much in size and shape, and may considerably obstruct the labor. They are sometimes the cause of contusion and rupture of the soft parts, resulting in vesico-vaginal fistulæ. By the use of a metallic sound or catheter they are generally detected.

Treatment.—An attempt should be made to press up the stone above the superior strait prior to the engagement of the head; but, unfortunately, this is not always possible, because the head may have descended too far to be pressed back, so that the stone is wedged in between it and the symphysis pubis. If podalic version or the forceps is not admissible, the only alternative is the

performance of *vaginal lithotomy*. In performing this operation the bladder should be incised directly on the stone through the anterior vaginal wall.

There are certain affections which may render delivery difficult or impossible without the intervention of art. These are—

Hemoptysis and Hematemesis.—If the hemorrhage is inconsiderable, there is nothing to be done, but if it becomes alarming during the pains of childbirth, the labor should be terminated as soon as the dilatation of the os will permit the application of the forceps or podalic version.

In **aneurysmal tumors**, either of the abdomen or the chest, and in chronic diseases of the heart, delivery should be accomplished rapidly in order to prevent sudden death, caused in these cases by the violent strainings to which the woman involuntarily gives way during the second stage of labor. Aran reports cases of sudden death in labor caused by valvular stenosis.

Asthma.—Rapid delivery by forceps or by version should likewise be effected in all cases where any considerable obstacle to the respiration is found to exist, as in asthma or such as may occasionally be met with in women of small stature, in whom the uterus may be so enormously distended as to press the diaphragm and lungs toward the upper part of the chest, thus disturbing the respiratory function during the latter months of pregnancy (Cazeaux).

The writer once attended in consultation an aggravated case of asthma complicating pregnancy. The patient, an old asthmatic multipara, at the end of her eighth month of pregnancy was found standing, bent forward and supported on the arms of two friends. She could not breathe

otherwise ; was blue in the face ; had loud hissing, sibilant râles ; her pulse was weak and very frequent. It seemed to the writer that she could not live long in that condition, and he determined to induce immediately premature labor. This induction was accomplished under great difficulties, as the patient was standing during the operation. It was performed by introducing a No. 12 English catheter between the uterus and the membranes ; the cervix was dilated with Barnes' bags and the fingers. Then the membranes were ruptured. Energetic contractions soon set in, and, placing the patient on the bed, the writer rapidly applied the forceps and delivered her quickly of a living child. Her relief was immediate. The whole of the above procedure did not last two hours, on account, probably, of the relaxation of the parts.

CHAPTER VIII.

THE UNCONTROLLABLE VOMITING OF PREGNANCY.

THERE are very few women who do not suffer from nausea and vomiting during the early months of pregnancy. This affection, although very annoying to the patient, generally ceases gradually about the fourth month. It can hardly be called a disease, and this form of vomiting is so well known and the remedies suggested are so familiar that it should scarcely be mentioned here. The late Professor M. M. Pallen considered this affection rather as an effort of nature to get rid of the effects of malnutrition or of some "peccant"

humors, as these were then called, and that therefore this was rather an advantage to the patient, the vomiting to be checked only when excessive.

But there is another form of vomiting that seems to resist all remedies, and which, beginning as a moderate annoyance, may become a very serious disease, often the indirect cause of abortion, and occasionally bringing the woman to the portals of the tomb. This form of pernicious vomiting presents three stages, which could not be better described than by quoting the descriptions given by Dubois and Chomel:

First Stage.—"The irrepressible form of vomiting rarely begins suddenly, but insensibly follows the simple form, generally appearing under two months; it may develop later in pregnancy. The irrepressible cases are characterized by very frequent vomiting, in which all or nearly all the food taken by the patient is ejected. The smallest quantity of food, even a few drops of cold water, is sufficient to excite the vomiting." Emaciation, debility, altered features, insomnia, and almost constant ptyalism characterize the condition (Stoltz, Cazeaux). This first stage is devoid of marked fever.

Second Stage.—Fever sets in with a temperature of 101° to 102° F., the pulse being from 100 to 140 per minute. The vomiting is almost always constant and violent; rapid emaciation takes place; the mouth becomes dry, the thirst is intense, the breath acid and fetid.

Third Stage.—There is a change in the symptoms: the attacks of vomiting cease or become less frequent and less severe; but it is a deceitful calm, which the experienced physician knows to be the prelude to death (Dubois). The fever persists; syncope and cerebral symptoms appear. There are intolerable neuralgic

pains, disordered sight and hearing, hallucinations and delirium (which is that of starvation), coma, and death.

The progress of this terrible affection is usually slow, as the patients do not generally succumb until after the second or third month of the disease.

Hopeless as these cases may appear, they are not necessarily disastrous. Nature has many resources at her command; for example, the supervention of an acute attack of diarrhea or cholera, or a violent emotion, may suddenly put an end to the most intense vomiting. Burns and Desormeaux state that they had never known vomiting dependent on pregnancy alone to have a fatal termination. The vomiting may be caused by some intercurrent disease, such as malignant affections of the stomach, tubercular peritonitis, etc.

Some patients, whom the vomiting due to pregnancy had reduced to an apparently hopeless condition, have suddenly been restored to health by the transference of the irritation of the uterus to some other organ. Cazeaux relates the case of a young German lady, two and a half months pregnant, who was troubled with obstinate vomiting from the first two weeks after conception. She was extremely emaciated and feeble, her stomach rejecting even the smallest amount of cold water, and her breath was disgustingly fetid. In short, her symptoms were so serious that M. Dubois, whose patient she was, requested the advice of Chomel. Both these physicians came to a most unfavorable prognosis, and the production of an abortion was considered by Dubois as the only resource which could save her life. On the second day after the consultation the patient was attacked with violent purging, and from that time the vomiting ceased and never returned. The poor sufferer was at once able to

take and retain some nourishment. In two other cases, which Prof. Dubois relates with commendable frankness, he had decided that it was his duty to propose the induction of premature labor. The women declined submitting to the operation, and reached the term of their pregnancies in good health, and were safely delivered of healthy children of the ordinary weight and size.

Generally speaking, the vomiting seems to have but an indirect influence on the life of the child. "I do not know," says Cazeaux, "of a single well-attested case of death of the fetus from inanition through defective nutrition of the woman, although these violent efforts at vomiting might so shock the uterus as to cause an abortion."

Fortunately, the pernicious vomiting of pregnancy is a rare affection. It has seldom been observed in Germany. Carl Braun in 150,000 cases of obstetrics has never observed a single fatal termination; while French, English, and American obstetricians have not been so fortunate. Robert Barnes saw 9 fatal cases; McClintock shows a much worse experience; O. W. Doe, an American, collected 48 cases of this disorder, with 18 deaths; Guéniot, a French accoucheur, records 118 cases, with 46 deaths. Professor W. W. Jaggard, in his admirable essay on the *Pathology of Pregnancy*, remarks that "the diversity of the observations by accomplished obstetricians is suggestive;" that "it is hardly probable that national characteristics, the environment, or other external conditions are adequate to the creation of such essential variations in the course of this disorder. It is noteworthy that in many of the cases of death from alleged hyperemesis of pregnancy the diagnosis has not been verified by post-mortem examination."

The post-mortem researches, when made, have often revealed that the sources of this vomiting were quite independent of pregnancy—that the vomiting was caused by ulcerations or cancer of the stomach, tubercular peritonitis, tabes mesenterica, or fibroid tumors of the uterus, as observed by Tilt and others. These observations accord with Burns' statement, referred to above, that he had never seen a fatal case of hyperemesis dependent solely on pregnancy. Trousseau, after attempting to produce an abortion as a remedial measure in a case of uncontrollable vomiting thought to be due to pregnancy, discovered at the autopsy that the uterus was empty and that the woman had died from a cancer of the stomach.

Ahlfeld reported 3 cases in which he seriously considered the artificial interruption of pregnancy. In each of these cases, however, it was possible to alleviate the disorder without recourse to the evacuation of the uterine contents. Winckel and Cohnstein have been equally successful in the treatment of this disorder by therapeutic means alone. P. Dubois asserts that he observed 20 fatal cases, but it is to be noted that no post-mortem examinations were reported as having been made in these fatal cases, which omission leaves room for a suspicion that the pernicious vomiting may have been caused by disease independent of pregnancy.

Horocks pertinently remarks that "when there was no post-mortem examination of a fatal case of vomiting I do not believe that one is entitled to say that the pregnancy caused the fatal vomiting." "Skepticism as to the alleged frequency of the fatal cases of this disorder in the present state of our knowledge is accordingly eminently in order," says Jaggard, who adds that "when the symptom

is due to pregnancy alone, in the entire absence of the aggravation of any previously existing condition, the outlook is favorable. It is doubtful whether an authentic fatal case of this kind is recorded. But when the vomiting is due to the aggravation of a previously existing lesion of the alimentary canal, particularly gastric ulcer, cancer of the stomach, etc., the prognosis becomes much more serious. Cases of the gloomiest prognosis are those in which the hyperemesis sustains no causal relation to pregnancy."

The writer had two fatal cases of pernicious vomiting. In one the vomiting was irrepressible, brought up blood and greenish pus, and was accompanied by severe epigastric pains. The cause of death proved to have been a large gastric ulcer. In the other case a malignant growth and perforation of the stomach was revealed by the post-mortem examination.

It is admitted by many authorities that the pathogenesis of this disorder is reflex. Thus the irritation from an ulceration or erosion of the cervix (J. H. Bennet), or that caused by a retroflexed or an incarcerated uterus or by ante flexion (E. Gehrung, Graily Hewitt), may, through reflex action, originate the nausea, which afterward becomes aggravated and terminates in the uncontrollable vomiting of pregnancy.

It is to be noted that this disorder is to be met with oftener in primiparæ than in multiparæ, and that it may occur as a family idiosyncrasy. The writer attended three sisters with this uncontrollable vomiting of pregnancy, all of whom recovered.

Treatment.—A number of medicines have been proposed for the cure of the vomiting of pregnancy. If one drug fails, another may succeed. Tentative efforts

should be made by groping along, as it were, amid the long list of medicines suggested.

In the first (apyretic) stage, and before the patient is in real danger, but is harassed by an annoying and almost constant nausea and vomiting, great attention should be paid to the diet. She should breakfast in bed and then take a short nap. These patients' appetites are sometimes very capricious and even unreasonable; for instance, the lighter articles of food may be rejected, while the most indigestible substances, such as sausage, pickled pork, cheese, etc., will be retained. In light cases the writer has seen relief obtained by eating salted popcorn and salted almonds. Effervescent Vichy or alkaline waters or ice in the mouth will often give relief. Sometimes, when other means have failed, the use of champagne, wine, and even of brandy almost to intoxication, or kirschenwasser (on account of its hydrocyanic acid), will succeed very well.

But if, notwithstanding these or similar means, the vomiting continues uncontrollable, 10-grain doses of the oxalate of cerium, as recommended by Simpson, or the same dose of the subnitrate of bismuth associated with 10 drops of dilute hydrocyanic acid or with 2 drops of beechwood creosote every two hours, may succeed. A few leeches or cups applied at the pit of the stomach, if there be marked epigastric pains, will give relief. When ulcerations or erosions of the cervix are discovered through a speculum, they should be touched several times with the pure nitrate of silver, often with the happiest results. When these means fail, $\frac{1}{4}$ grain of cocain may be given every two hours, or a hypodermatic injection of $\frac{1}{4}$ grain of morphin, repeated every three hours; it should, however, be remembered that often morphin causes vomiting, in

which event it should be stopped. One drop of wine of ipecac or one drop of tincture of iodine, often repeated, is also said to have been successful. In case of the failure of these measures, give a 4-ounce enema of 40 grains of chloral suspended in starch-water or some nutritive fluid—for example, one containing Liebig's extract of beef or the whole of a fresh egg with milk—the retention of the enema being secured by pressing firmly the end of a towel wrung out of ice-water on the anus for fifteen minutes. Sometimes 40 grains of bromide of potassium may be associated with the chloral or be used separately. The prolonged state of constipation so habitual with women should be relieved by frequent laxatives, this constipation being frequently the cause of the vomiting.

In the pernicious cases resisting all these measures the Copeman plan of dilating the os with the index finger may successfully be resorted to. It is a hazardous method, not devoid of the risk of inducing an abortion, which is then indirectly produced, the direct production of it never being permissible and not indicated. Cazeaux says: "Although it may be justifiable to induce premature labor at seven or eight months in cases of contracted pelvis, I have no hesitation in declaring myself against the production of abortion in the above cases of vomiting. The induction of premature labor in cases of contracted or obstructed pelvis foreshadows an issue fatal to the child, unless a Cesarean section or a symphyseotomy be performed. But in the case of vomiting, no matter how violent, and notwithstanding the state of exhaustion to which the patient may be reduced, the issue is not inevitably fatal." Unlooked-for recoveries will frequently occur either spontaneously or from the effect of the medicines. Observers of the high-

est experience (C. Braun, Kiwisch, Hohl, Ahlfeld, Cohnstein, Cazeaux, etc.) have never been compelled to resort to the production of abortion in cases of uncontrollable vomiting of pregnancy.

Carl Braun lays the greatest weight upon the expectant treatment and more modern medication of these cases, and says that after a conscientious estimate of all considerations and contraindications artificial abortion may be omitted. Braun is an authority of the highest order, his experience extending, as before stated, over the marvellous number of 150,000 cases of obstetrics.

According to all these authorities, it is proved that in the great majority of cases the mortality accompanying irrepressible vomiting is not caused by pregnancy alone, but is by some pathological lesion independent of pregnancy, and that therefore the production of abortion will not cure the hyperemesis, and is a useless procedure.

This statement of the question has been emphasized in this chapter in order, on the one hand, to check the ardor of some too aggressive surgeons, and, on the other hand, to give hope and encouragement to those too timid or too easily discouraged.

In all cases of obstinate hyperemesis the state of the uterus should carefully be ascertained. It may be completely retroverted or retroflexed, and even be incarcerated in the pelvis. The uterus then should gently be repositioned, the woman being placed in the genu-pectoral position; the retroverted uterus should be elevated by two fingers of one hand in the rectum, and conjointly through the vagina by the other hand. The bladder and rectum should be evacuated, using for the latter a syringe with a very long elastic hose or tube, reaching past the promontory and back of the uterus, where

may often be found impacted large and hard masses of feces retained above the fundus and the promontory of the sacrum. After the reposition an Albert Smith, a Hodge, or a Thomas pessary should properly be adjusted, and the patient be kept for some days in bed, lying chiefly on her chest, with elevated hips. This posture has often been found to relieve immediately the worst cases of uncontrollable emesis. Prolapsus or procidentia uteri should be corrected by the usual methods recommended in treatises on gynecology.

CHAPTER IX.

THE INDUCTION OF PREMATURE LABOR.

OF all the operations of midwifery, the induction of premature labor is the most conservative and beneficent, as its object is to save the mother and the child; without this operation the latter would possibly be exposed to the murderous operation of craniotomy, and the former to the comparative dangers of the Cesarean section. The induction of premature labor should therefore be performed between the seventh month and the end of gestation, when the child can live out of the womb—that is, when it is viable.

History.—The induction of premature labor originated in England, where, in 1759, it is said, Mary Donnelly, a London midwife, first performed it, saving the mother and child. Her success came to the knowledge of the

judicious Denman, who in 1780 called a consultation of the most celebrated obstetricians in London. After due deliberation, they accepted the operation as perfectly justifiable and one to be recommended in cases in which labor at term would be obstructed, and could not be terminated without the destruction of the child. Denman himself performed the induction of premature labor in several cases, three times on the same woman, saving her and two of the children. His example was soon followed by other English obstetricians, such as Merriman, Ramsbotham, Burns, etc., so that the operation soon became very popular in England, and so remains. This, is therefore, undoubtedly an English operation—a sort of atonement for child-murder so frequently before committed. All honor is due to England for this great boon to humanity.

A few years afterward this operation found its way into Germany, where, gradually, it met with great success, a success continuing to the present day. Schroeder admits that the English introduced this operation, but claims that the Germans perfected its technique, which claim is true.

Without being acquainted with the results obtained in England, Ant. Mai in 1799 appreciated its merits, and Weidman, with Wenzel, in 1804 gave rules for its performance, as also did Ant. Krause in 1813. But until 1818 the operation met with poor encouragement, owing to its severe condemnation by Baudelocque. To the discredit of France, owing to the opposition of this great man, the master of obstetrics in his time, the operation was rejected in that country until Prof. Stoltz of Strasbourg in 1831 performed it with complete success. His example was soon followed, and, to the credit of France,

it must be said that in no other country is it now more commonly performed.

In Germany the majority of influential obstetricians endorsed the operation, with the exception of F. Oslander, Joerg, and the junior Stein. Kluge performed it twenty times, and Ritzgen thirty times with great success. In Holland the operation was introduced by Solomon, J. Themmen, and others; in Italy, by Lovati, Billi, and Ferrario, who obtained brilliant successes.

It is only in France, as said above, that the induction of premature labor met with an extremely stubborn opposition. Already, in 1718, long before its adoption in England, Roussel de Vauzemes had proposed it in order to avoid Cesarean section in certain cases, but his proposition passed unnoticed, and the fate of the operation was settled for a long time when Baudelocque declared that it was not only useless and dangerous, but even criminal in cases of contracted pelves. So great were the authority and prestige of that illustrious man that for a long time no credence was given in France to the fortunate results obtained in other countries. Baudelocque objected to a measure of which he would have judged differently had he not entirely misconceived its nature and object. In America this advance in obstetrics was rapidly adopted, and is now performed for many more indications than at first proposed.

Benefits.—The indication for premature labor in cases of contracted pelves is based upon the fact, which experience teaches, that the head of an immature child is smaller and, on account of the softness of its bones, is more susceptible of accommodating itself to the shape of the pelvis, than is the head of a child at term. Frequently, premature children are born spontaneously at

seven or eight months without the intervention of art, and are saved without risk to the mother. Art has taken a hint from such cases, and has adopted measures to bring on a premature labor at the time at which the child becomes viable.

Numerous cases are on record of women who could not be delivered at term without serious operations and the loss of their children, while they safely gave birth to healthy children in other pregnancies when delivery occurred a few weeks before the normal term.

Observation of similar cases doubtless inspired the idea of artificially provoking premature labor. This operation is, after all, only a happy imitation of the process of normal labor (Naegele).

The presentation of the child must also be taken into consideration, and abnormal presentations are not uncommon in contracted pelves. Goodell asserts that an easier labor for the woman results from a pelvic presentation of the child, especially in a very narrow pelvis. This presentation gives frequently a living child, born spontaneously, especially if it be a female, when the preceding children, being males and usually with larger and harder heads, had been craniotomized.

In pelvic presentation the greater facility of the birth is, according to Simpson, caused by the head entering the pelvis as a wedge by its shortest diameters, which are, first, the bimastoid, then the bitemporal, and, finally, the biparietal diameters, allowing the gain of one inch through the compression of the cranial vault by the sides of the mother's pelvis. This compression causes also the lapping over at the sutures and fontanelles.

High authorities (Lachapelle and others) have accordingly recommended that we should endeavor in pelvic

contraction to transform a vertex into a pelvic presentation. This can usually be accomplished by external version, but occasionally requires the bipolar method. The child should be secured in that new presentation by an abdominal binder with a strong pad on each side of the abdomen until the end of the labor. This contrivance, which is known as Pinard's eutocic bandage, is described in the chapter on *Version*, and can easily be constructed with a little ingenuity. Wiegand many years ago (in 1812) taught the same method.

As an illustration of the above point the writer will refer to a very interesting case which he observed some time ago. The patient was a short, stout, healthy Englishwoman, who in her native country had been three times delivered of boys by craniotomy after extremely hard labors. After her coming to America she was attended in St. Louis by the writer. Pelvimetry showed that she had a contracted pelvis, the true sacro-pubic diameter measuring 3 inches. The information so gained was utilized in her three succeeding pregnancies, premature labor being induced at seven and a half months by the Krause method. The three children so delivered were males. Two lived a few hours, the other a few days. Two years after the birth of the last the writer was called by the woman to her house, and was shown with great joy a large healthy girl a year old, it being her seventh child. But it is to be noted that it was a *female* infant, born spontaneously at the eighth month by the *breech*. The others had all been *males* and presented by the *vertex*. This fact confirms the teaching of Goodell, Meline, and Simpson that a pelvic presentation, especially before term, is most favorable to the child. At term the same presentation is very dan-

gerous to the child, as experience teaches, on account of the retention of the after-coming head.

It is important also to ascertain if the woman is pregnant with twins, because they are smaller, have less vitality, and are frequently born prematurely. In this case one might wait a little longer, preferably to the eighth month, before provoking labor, because the longer the child remains in the uterus the better are its chances of life.

How to Ascertain a Twin Pregnancy.—The *diagnosis* of twin pregnancy is best done by abdominal palpation and auscultation.

Palpation.—In twin conception, on uncovering the woman's abdomen, one can at once notice the considerable dimensions of the uterus, the irregularity of its shape, a depression, even a sulcus, crossing obliquely the abdominal walls. This sulcus is always present when the two fetuses are lying obliquely one above the other, as generally happens, but it does not exist when the fetuses are one in front of the other. By abdominal palpation the diagnosis is easy in the first instance, but is difficult in the latter. At any rate, palpation at once reveals the great volume of the uterus and its irregular shape, but its tension, on account of a greater amount of amniotic fluid, renders the diagnosis more difficult, as the fetal parts are not so well defined.

By palpation it can be ascertained that in twin pregnancy the large fetal tumors are double; for instance, one head can be found near the superior strait, the other at the fundus of the uterus, and the back of one child can be made out extending downward and out to the right or left. In other instances there may be found two breeches, two backs, and only one head in one of the

iliac fossæ; the other head, being concealed in the excavation, can only be found by the vaginal touch. This is a very delicate point in obstetric diagnosis.

Auscultation will generally much assist by revealing the beat of two hearts at different points.

Charpentier justly remarks, however, that in case of rickets, with a marked narrowness of the transverse diameter, the conjugate remaining normal, the uterus is developed almost entirely above the superior strait, and consequently the volume of the abdomen will always indicate a pregnancy more advanced than it really is. Due allowance should be made for this disproportion in sizes, else, instead of securing the birth of a living child, one may in reality have performed an abortion resulting in a non-viable child. This is also a very delicate and puzzling question in practice. Another delicate point is the—

Diagnosis of a Hydrocephalous Fetus.—The considerable size of a semi-hard tumor, which is the head of the child, can be ascertained by abdominal palpation; the touch will assist in correcting mistakes. The extreme width of the sutures and fontanelles will be recognized also by the touch. If the breech presents, the head of the child being hydrocephalous, one can by palpation alone arrive at a correct diagnosis of the presentation: if the shoulders present, the touch will ascertain the latter presentation very readily. The intercostal “gridiron” will be felt.

Diagnosis of a Dead Child.—In this case there is for several days a feeble motion of the child, and finally an entire cessation of active motion, a cessation of the lacteal secretion, and a feeling of coldness in the lower part of the abdomen. Should premature labor be then re-

sorted to? Yes, because the operation is harmless to the woman as compared with embryotomy at the superior strait in a contracted pelvis.

Time at which to Operate for the Induction of Premature Labor.—To obtain a desirable result the pregnancy should have reached seven and a half or eight months. But how shall one ascertain this date? The information given by the mother is often unreliable. Ahlfeld has presented elaborate tables to find out the probable size of the child and therefore the age of the pregnancy, but his very scientific rules are too complicated to be practical. It is safe enough to follow the rules of Cazeaux in order to ascertain the age of the pregnancy, and consequently the probable size of the child. The following are Cazeaux's rules : At the end of the fifth month the fundus uteri is one finger's breadth below the umbilicus, and at the same distance above it at the expiration of the sixth month; at the end of the seventh month the fundus uteri is four fingers' breadth above the umbilicus, and five or six at the eighth month, and always inclined to the right side; at the seventh month the umbilicus begins to pout; at the ninth month the fundus reaches the epigastric region and gains the border of the false ribs on the right side (Fig. 19). In the last fortnight of the ninth month the fundus sinks somewhat, which enables the woman to breathe and walk more easily. However, in transverse presentation of the child the uterus lies obliquely, and the fundus can be felt at the side of the mesial line.

The time when motion was first distinctly felt must be noted. This will happen at the end of the fourth month generally—sometimes sooner. But some women never feel motion, yet give birth to healthy, living children.

The child then is too lazy to kick or the mother may be very fleshy, the child's movements, which would otherwise be felt by the nerves in the skin of the woman's

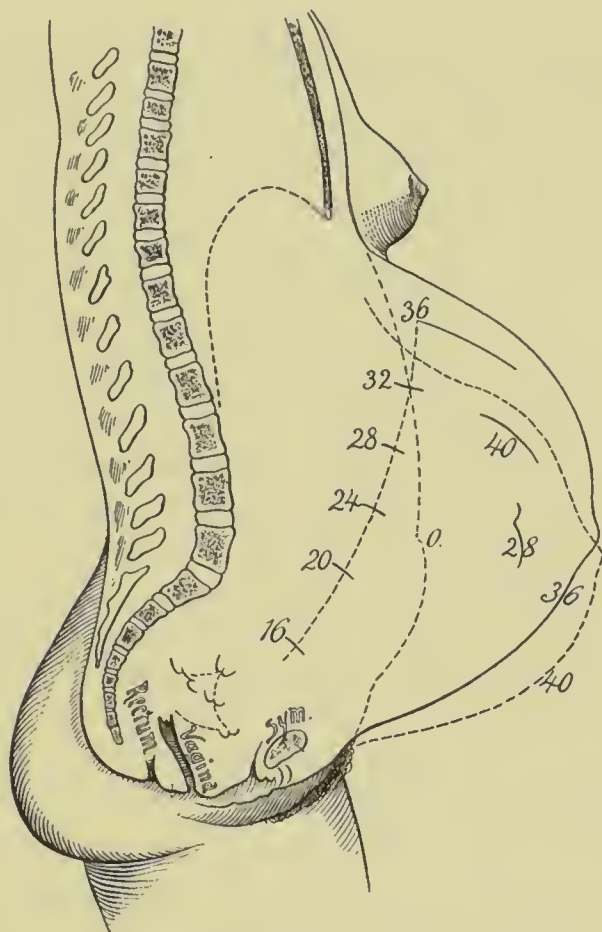


FIG. 19.—The non-gravid abdomen, and the same at eight months, with the varying heights of the fundus marked in weeks (Schaeffer).

abdomen, not being transmitted on account of the large amount of adipose tissue.

Indications.—The indications are *relative* and *absolute*. The *relative indications* are furnished by those diseases of the pregnant woman that are certain to end her life before

she can give birth to a viable child. Such diseases are—the last stage of phthisis pulmonalis; advanced Bright's disease, with general anasarca and effusion into the large cavities; edema of the lungs; suffocating asthma; goiter, impeding respiration; large and fixed pelvic tumors that cannot be pushed up in order to allow the child to pass (Ashwell); serious heart disease and aneurysm threatening rupture from the efforts of labor; dropsy of the amnion, which should be punctured at seven months to prevent death from suffocation, the puncture being made high with a catheter, and the amnion drained very gradually to avoid shock and post-partum hemorrhage from uterine inertia. Also those rare cases of placenta prævia where the woman is in danger of bleeding to death before the os can be dilated (Barnes); convulsions; grave chorea, when the patient cannot swallow; and the uncontrollable vomiting of pregnancy lasting to the end of the seventh month. In all such cases it is very desirable to have a consultation with some prudent physician, to share the responsibility and perhaps to save one's self a suit for malpractice.

The induction of premature labor offers a most valuable resource in eclampsia when all ordinary methods fail and the attacks return more and more frequently. The writer saw a very instructive case of this nature with Dr. Walter Coles. The patient was a perfectly healthy young primipara near her term, with edema and albuminous urine. The vertex presented. Without any warning the patient was taken with eclamptic convulsions, recurring at long intervals. There was a total absence of pains. The os did not dilate, notwithstanding a copious venesection and the free administration of chloroform, of morphia, and of chloral hydrate per rec-

tum. Gaining no ground, we then had recourse to forcible dilatation of the cervix with the fingers, then with Barnes' dilators, followed by the introduction of a bougie to a depth of 8 inches into the uterus. Labor began in six hours. When dilatation was sufficient the membranes were ruptured; this was soon followed by severe labor-pains, which were terminated by a high application of the forceps. Mother and child did well. These relative indications apply even to cases where the pelvis is normal.

In urgent cases, with a pelvis measuring 3 inches at the true conjugate, the induction of premature labor is indicated. The conditions are a little different in the case of a multipara from those in that of a primipara (Charpentier). With a multipara all depends upon the way the preceding labors have taken place. If they have been almost natural, although difficult and prolonged, there is no reason for the operation. But if these earlier labors require the forceps or a difficult version, one must act with a little more caution. We must not forget that the size of the child usually increases with the number of pregnancies, especially when boys are borne. Therefore difficulties might be met at the fourth or fifth pregnancy that were not present at the first. In this case one is justifiable in interrupting the pregnancy a little before its normal termination if there be serious causes for acting, such as severe asthma, phthisis, etc. (Charpentier). Other indications are exostoses; pelvic fibroids and ovarian tumors (although the existence of these is not always incompatible with the successful termination of pregnancy. Spencer Wells several times removed ovarian tumors without interrupting pregnancy); renal disorders which may be followed by eclampsia;

chorea when excessive, as it may lead to insanity (Grandin and Farnham); irreducible displacements and impaction of the uterus.

In cases of women having had repeated stillbirths at seven or eight months the operation should be done at the beginning of the seventh month, giving the child at least some chance of living. Rare instances are on record of children being born viable at that period. The laws of France and of Prussia admit that a child born 210 days—that is, seven months—after the husband's death may, under certain circumstances, be considered viable, and therefore may inherit; that is, although it survive but a few hours its relatives may inherit through it. It has obtained legal recognition as an individual, as there has existed at least a possibility of its living. Voltaire and Frederick the Great of Prussia were born at seven months, and both lived to be very old.

Absolute Indications.—Measurements of the Child's Head and of the Mother's Pelvis.—The diameters of the child's head decrease as the child is farther from the normal term. All authorities, among whom are Stolz, Naegele, Dubois, Tarnier, and Budin, agree that the biparietal (being the most important) diameter is—

At beginning of 7 months, 5 centimeters, or 2 inches.

At end of 7 months, 7 centimeters, or 2.75 inches.

At $7\frac{1}{2}$ months, $7\frac{1}{2}$ centimeters, or 2.96 inches.

At 8 months, 8 centimeters, or 3.15 inches.

At $8\frac{1}{4}$ months, $8\frac{1}{2}$ centimeters, or 3.35 inches.

At 9 months, 9 to $9\frac{1}{2}$ centimeters, or 3.75 inches.

In a normal pelvis the true conjugate diameter is $4\frac{1}{2}$ inches and the transverse diameter is $4\frac{3}{4}$ to 5 inches. Therefore in a pelvis contracted to $2\frac{1}{2}$ or 3 inches induc-

tion of premature labor should be attempted at seven or seven and a half months. But with a pelvis contracted to as much as 2 inches the operation may be attempted at the beginning of the seventh month, as there is then at least a possibility of the fetus being viable. However, with a contraction below 2 inches there remains no alternative but the Cesarean section or symphyseotomy, or craniotomy if the child be dead.

In cases of the Naegele oblique-oval or the Robert pelvis Pinard has lately performed a new and original operation termed *ischio-pubiotomy*, which consists in dividing with a chain-saw the horizontal and descending rami of the pubic bone on the ankylosed side, 2 inches from the symphysis. He thus gained 2 inches, which enabled him to deliver easily with a Tarnier forceps a living child weighing eight pounds. In former times the only alternative would have been craniotomy, or more recently Cesarean section.

With a pelvis contracted to $3\frac{1}{2}$ inches some authorities claim that the provocation of labor is not called for, because podalic version or an application of the forceps would succeed in delivering a living child. But Cazeaux judiciously remarks on this subject that artificial premature delivery (under the above circumstances) being a harmless operation, one would greatly regret if, after having waited until term, it became necessary to perform Cesarean section or symphyseotomy with all its risks: this is the very degree of contraction for which symphyseotomy is resorted to in our days, not being sufficient to indicate a Cesarean section. In the interest of the child were it not, therefore, better that it should encounter the mitigated risk of a premature birth rather than the perils of the above operations, or even than the

dangers of a difficult forceps application or of a still more dangerous version?

Methods of Inducing Premature Labor.—Several methods have been employed, some of them useless, others dangerous. All the measures resorted to have for their object the origination and maintainance of uterine contractions.

Oxytocics of all kinds, such as ergot, electricity, etc., are useless or dangerous, as are also frictions on the neck of the uterus or abdomen, the tampon, and the colpeurynter; these measures are slow and only preparatory. The introduction of sponge-tents in increasing sizes has succeeded with some, but they are not to be used in cases requiring a prompt delivery; moreover, they soon become very offensive, may become a source of sepsis, and cause the premature rupture of the membranes, the integrity of which one wishes to preserve as a protection to the child.

The Cohen method, which consists in injecting 7 or 8 ounces of tar-water or pure warm water between the membranes and the uterine wall, is a very dangerous method, by which several lives have suddenly been lost on account of the entrance of air into the veins and its being carried to the heart. This is especially to be feared if the membrane has been accidentally ruptured. Therefore the Cohen method is to be absolutely rejected. The writer came near killing three or four women by this method before he knew better. They had very narrow escapes from death by heart-paralysis and syncope. The injection into the uterus of carbonic-acid gas, as suggested by Simpson, is also a very dangerous practice.

The Kirwisch method, which is the directing for two

hours at a time of alternate streams of hot and cold water against the cervix, is only a preparatory measure. This method is occasionally very dangerous, producing death from shock. Tyler Smith used it until he met with a fatal case. Olshausen, Simpson, Depaul, and Tarnier also had deaths from this method. It is very strongly condemned by Barnes, who quotes several unfortunate cases, and is, at the best, only preparatory to the next and far the best procedure—namely, that of Krause, now generally employed in Europe and America.

The Krause Method.—After the patient's bowels and bladder have been well evacuated and the vagina thoroughly washed with warm water rendered antiseptic with 2 per cent. of creolin or 5 per cent. of carbolic acid, using no bichlorid of mercury, which is always so dangerous, a new No. 12 English bougie (not a catheter, as this may carry germs) is oiled with carbolized oil. The woman is placed in the Sims semi-lateral position; a Sims speculum is introduced, the anterior lip of the cervix is secured by a strong volsellum, and the bougie is gently introduced through the cervix into the uterus, following the axis of the superior strait. The bougie is guided between the uterus and membranes to the depth of about 8 inches. The vaginal end is then tied into a knot, and left there. The vagina is stuffed very fully with iodoform gauze, which acts also as a tampon, soliciting uterine contractions. In packing the vagina avoid the course of the urethra, in order to prevent the necessity of catheterization. One can now leave the patient, to be called probably within from six to twenty-four hours. The uterine contractions will then have begun, and the cervix will be found softened. The

bougie should now be withdrawn and the os dilated forcibly with the fingers. If it still remains contracted and the case be very urgent, multiple incisions around the os should be made with a probe-pointed bistoury or with scissors; the Barnes bags, modified by McLean (Fig. 20), are then to be used, and when sufficient dila-



FIG. 20.—McLean's model of Barnes' bag.

tation is obtained the membranes should be ruptured and the labor rapidly terminated with the forceps on the head, or on the pelvis if the child presents by the breech. These operations should be performed quickly but prudently, as it is the child's life which is to be saved, the mother being in very little danger.

Some failures by Krause's method have been reported. These failures were caused by the bougie not having been introduced far enough. Sometimes it is best to reintroduce a larger bougie and separate the membranes farther by a to-and-fro movement. If in so doing the membranes are accidentally ruptured, it is a slight misfortune, somewhat dangerous to the child before dilatation, as uterine contractions are solicited by this rupture. If the bougies be introduced between the placenta and the uterine wall, there need be no fear of a dangerous hemorrhage, as the blood will coagulate in the narrow path made by the bougie and stop the hemorrhage, the hyperinosis of the blood of pregnant women greatly favoring its coagulation.

The above is the technique which the writer followed in a dozen instances in provoking premature labor, with

the saving of ten of the children and all the women. An interesting case may be mentioned in which the writer used the Kiwisch method before he was acquainted with its dangers. The patient was a lovely young married woman pregnant seven months. The induction of premature labor was decided upon, on account of the patient's lordosis and a contraction of the true conjugate diameter, which was not above 2 inches; this had been ascertained previously by a careful pelvimetry. (Parenthetically, the writer must say that the art of accurate pelvimetry is not taught enough in our schools of medicine.) After douching the cervix for two days it was found dilated enough to permit the introduction of a bougie, which brought on labor. The child was lost, but the mother was saved. The writer has since learned that labor terminating a subsequent pregnancy proved fatal in consequence of its not having been provoked prematurely. This case furnishes an instructive lesson.

Among the most trying cases in the writer's experience was that of a very feeble woman suffocating and cyanotic from a fearful attack of asthma. The labor was brought on by the above measures in the incredible time of two hours. The child was near term and lived. It may be remarked, in conjunction with this case, that in some women the womb is so irritable that the slightest provocation will awaken its contractions, causing it to cast off its contents.

If the mother's condition demands an immediate delivery, the method is as follows: Place the woman in the Sims semi-lateral position, use a Sims speculum, give a large antiseptic douche, seize the anterior lip of the cervix with a strong volsellum, introduce the bougie as directed above, leave it in a short time, and use forcible dila-

tation of the cervix with the fingers and with Barnes' bag if at hand. If the cervix still remains hard, practise multiple incisions around it with a probe-pointed bistoury or with scissors, rupture the membranes, and, when the cervix is dilated to the width of three fingers, apply the forceps or have recourse to bipolar version; secure the retraction of the uterus, which is taken by surprise; if not, the obstetrician will have to combat a post-partum hemorrhage; remove the placenta and examine it to ascertain if it be entire. Afterward use antiseptic douches for several days.

After-care of the Child.—With the birth of the child our duties are not over, as it is immature and the mother has as yet no milk in her breasts. Therefore the services

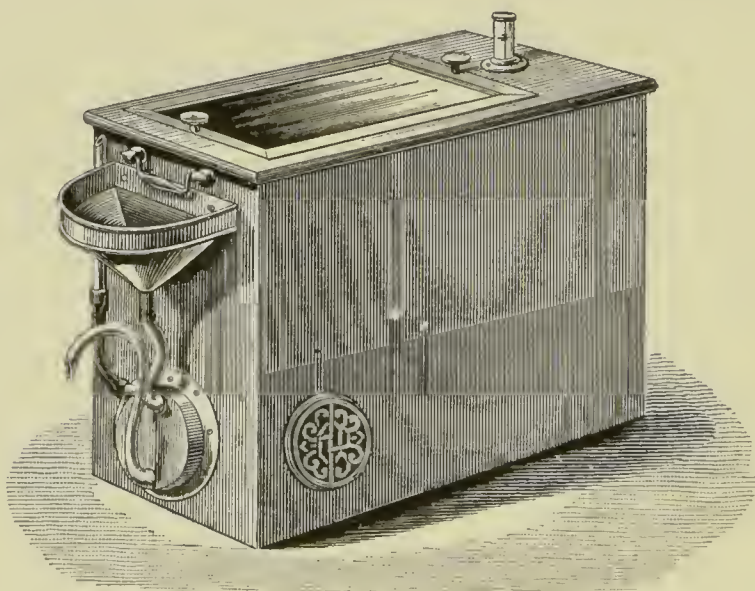


FIG. 21. Anvard incubator or couveuse.

of a wet-nurse should be secured. As the young infant does not generate much heat, it should not be dressed for a few weeks, but should be wrapped in a thick layer

of cotton batting covered with flannel or oiled silk. Two long Rhine-wine bottles, filled with hot water and well corked, should be placed one on each side of the infant, and a smaller bottle of hot water at its feet. A Tarnier, a Credé, or an Auvard *couvuse* (Figs. 21, 22) should be secured or improvised.

According to Tarnier, if a wet-nurse is not secured,



FIG. 22.—Interior view of Auvard incubator (Fig. 21).

the child should be fed for a few days with water and milk (using a medicine-dropper), or gavage should be employed, because the child may be too weak even to suckle a wet-nurse.

If the child be in danger of death, the parents, especially if they be Catholics or Episcopalians, should be informed of the danger, that they may have baptism administered.

CHAPTER X.

SYNCOPE AND SUDDEN DEATH IN LABOR.

Causes.—Syncope occurs commonly after painful and prolonged labors or after hemorrhages producing exhaustion. A fainting attack may also be caused by allowing the woman to get up suddenly during or immediately after labor. Rapid anemia of the brain is thus produced, and it is not unfrequently followed by sudden death of the patient, which is also very frequently due to venous thrombi. Spiegelberg states that the emboli which become detached during or shortly after labor proceed from clots formed at the site of the placenta. Usually, he says, there is first hemorrhage from partial detachment of the placenta, then thrombus-formation in the veins. The clots, in the absence of uterine retraction, extend from the open mouths of the sinuses in the direction of the heart. Finally, under a powerful contraction, such as oftentimes follows the rupture of the membranes or the rapid expulsion of the fetus, the clot is set adrift from its moorings, and is washed upward through the vena cava to the right side of the heart, and thence to the branches of the pulmonary artery.

The symptoms of stoppage in the large pulmonary vessels are intense dyspnea, air-hunger (to use an expressive German term), fluttering heart-action, a feeble, rapid pulse, a cold skin, and a striking pallor of the countenance. Death may follow in a few minutes; or, when the main trunk is free, the more violent symptoms may in the course of half an hour subside, to return, however, with the slightest movement or without apparent cause, the patient dying in a few days

from abnormal lowering of the temperature or from dyspnea with cyanosis. On the other hand, after a succession of attacks the thrombus may be absorbed and complete recovery take place, as in a case recorded by Lusk, from whose excellent treatise the above description is taken almost *verbatim*. A rarer cause of sudden death in labor is the entry of air into the uterine vessels. The air may enter during operations necessitating the introduction of the hand or of instruments into the uterus, and as a result of the knee-chest position, the latero-prone position, and even of the ordinary position upon the side. This is another proof that the obstetric position is doubtless on the back, especially when the operation of version or the forceps is selected.

Other causes of sudden death are mental emotion—such as fear, sorrow, or excessive joy—severe suffering, heart disease (Winckel), hemorrhage during or after labor, and asthma or pulmonary congestion. Sudden death may also be caused by migratory thrombi reaching the right side of the heart, as may happen in *rising suddenly* and also when the patient is affected with *phlegmasia alba dolens*. Embolism does not always occur immediately after labor, but sometimes is delayed until five or six weeks later, as was the case with the duchess of Némours, daughter of Louis Philippe. Five weeks after labor, in attempting to get into her carriage, she fell back dead in the arms of her attendant. The writer had in his experience a case of sudden death of a young and beautiful woman living in his neighborhood. This patient had been confined five weeks previously. In ascending the stairs she was suddenly taken with the symptoms described above. The writer was hurriedly sent for, and as he entered the room she fell back into his arms, gave

three gasps for breath, and expired. The autopsy in both the above-cited cases revealed that a migratory thrombus had reached the right side of the heart and caused sudden death.

Treatment of Syncope.—Means to reinforce the failing action of the heart should be adopted. Edward Rigby long ago advised the very frequent administration of laudanum, which he considers the best of all nervo-sthenics if given in very small doses at very short intervals. In a case of this kind the writer kept a patient from dying by sitting all night at her bedside and giving her 3 drops of laudanum and a teaspoonful of aromatic spirits of ammonia every ten minutes until reaction took place. In this case there could plainly be heard the peculiar “churning” murmur due to the mingling of air and blood in the right side of the heart. This patient was more or less cyanosed for twelve hours, and finally recovered. The writer now uses the stronger solution of ammonia as a respiratory stimulant. Profound venosity constitutes the chief danger.

CHAPTER XI.

PUERPERAL CONVULSIONS.

Introduction.—A most intensely emotional and appalling scene is that presented by a woman suddenly stricken by an attack of *eclampsia*, the name generally given to puerperal convulsions. Like a flash of lightning in a serene sky comes the convulsion, and as a violent hur-

ricane it casts terror and dismay into the hearts of those witnessing it. This affection, so rapid and so dangerous, has not failed to attract the attention of obstetricians in all ages. Hippocrates describes it graphically. Eclampsia generally occurs in the beginning of labor, especially during the period of dilatation. It sometimes declares itself immediately after labor, sometimes not for several days, and occasionally in the last three months of pregnancy. Ramsbotham reports its occurrence seven, nine, ten, and eighteen days after labor, Cazeaux twelve days after, Bailly twenty-nine days after, and Charpentier nineteen days after labor. These late cases, however, are seen when there are some serious renal troubles antedating labor.

Frequency of Eclampsia.—Statistics show that 1 case occurs in 350 labors, 77 per cent. being primiparæ. According to Winckel, eclampsia is most frequent in the last two days of pregnancy. From statistics furnished by Depaul it is shown that eclampsia has become a more frequent disease in the last forty or fifty years. This increased frequency, says Peter, is probably due to the fact that the custom of bleeding pregnant women is no longer observed.

It was the practice of Dewees to bleed women during pregnancy when indications presented. The writer knows in this city (St. Louis) a very healthy old lady who has given birth to nine strong children, and who had been bled by Dewees one or several times in every pregnancy. This "lost art" was followed by every obstetrician at that time, but is almost completely forgotten in present days.

Premonitory Symptoms of Eclampsia.—Eclampsia is usually preceded by premonitory symptoms, such as

frontal or vertical headache, disturbance of vision (amounting even to amblyopia and amaurosis), epigastric pains, mental depression, and edema of the hands and face.

The Attack.—Eclampsia is not preceded by a cry, as is epilepsy, which it very much resembles (Naegele). The eyes seem to be fixed upon some distant object. Then the storm bursts with quick convulsive movements of the small muscles of the face and of the eyes. Next the muscles of the upper limbs, then those of the lower extremities, are in succession convulsed. The face is turned first to the one and then to the other shoulder. The face of the woman presents a most hideous aspect: it is livid; the mouth is distorted and grimacing; every mark of intelligence and beauty is, for the time, blotted out (Parvin).

The tongue may protrude between the half-open jaws and be bitten. Foam issues from the mouth, made bloody by the wounded tongue. There are at first tonic and afterward clonic spasms, even opisthotonos. There is arrest of respiration, and from compression of the jugular veins the face becomes swollen and cyanosed. Subsequently all the muscles of the body are involved. According to Tyler Smith, the muscles of the larynx are also spasmodically contracted, producing an almost complete obliteration of the glottis; hence the hissing respiration followed by stertor, the asphyxia being the consequence of the suspension of hematosis. The heart becomes contracted during the general convulsions; this would explain the lividity and turgescence not only of the face, but also of the whole body in some cases. The contractions extend to the bowels and the bladder; hence occasionally involuntary evacuations take place.

At the beginning of the attack the pulse is strong and

full, but afterward it becomes frequent and feeble. During the paroxysm the patient is completely insensible. Coma follows, and after a more or less prolonged interval the patient generally awakens to a state of semi-consciousness until there comes another seizure, which will often take place within from a few minutes to half an hour.

Charpentier remarks that the attacks are not always the same, that in the majority of cases the movements are not very extensive, and that it does not require much force to restrain the patient; in other cases the patient shows a most violent agitation, during which it is with great effort that she is controlled and kept from throwing herself out of the bed.

In one of the writer's cases of eclampsia the patient, a vigorous young primipara, suddenly threw herself most violently from one end of the bed to the other while the forceps were being applied, thus necessitating his following her on all fours all over the bed. She seemed in the greatest danger of injury from the blades of the forceps, which were in place all the time. Finally, with the greatest difficulty, the writer succeeded in delivering her without any injury to herself or to the child.

The above condition represents the moderately bad cases, but in the worst cases the patient passes from one convulsion into another, with deepening coma and sopor. She may have thirty or forty of these convulsions, and yet may recover (Depaul, Naegele).

The duration of the paroxysm varies from two to five minutes, and in some rare cases lasts one hour or longer.

Winckel has observed that during the paroxysms the temperature rises from one to three degrees. This characteristic rise will much assist in making a differential

diagnosis between eclampsia and epilepsy. In the latter affection the temperature *does not rise*. On account of the restlessness of the patient and the closure of the mouth the temperature cannot easily be taken, except in the vagina. But this information is not necessary, as we have so many other characteristic symptoms. The temperature may occasionally rise to 104° F., especially just before death. This fact is important in relation to the prognosis, which becomes less favorable in proportion to this rise of temperature.

In general the paroxysms begin with the onset of uterine contractions, which during the labor may be so energetic as to expel the fetus without the knowledge of the patient or of the physician, so that it is proper to examine the patient frequently to ascertain the progress of the case, thus, perhaps, saving the child from suffocation in the bed-clothes.

Causes of Eclampsia.—The causes are *predisposing* and *determining*. Among the first are the conditions which coexist with the rapid elimination of albumin, as evidenced by its almost constant presence in the urine. This substance increases greatly during and decreases after the attack. In some rare cases albumin is not to be found, although there be eclampsia. The unmarried are more frequently attacked, says Wieger, who attributes the disease to grief and despondency, and to the fact that the unmarried are generally primiparæ. Of all predisposing causes, *primiparity* is the most incontestable. All authorities agree on this point, and show that five primiparæ to one multipara are attacked with eclampsia. *An extensive distention of the uterus* by twins or by hydramnios is one of the causes; so also is a prolonged labor.

Determining Causes.—On this point many theories have been advanced which it would be tedious to enumerate in detail. But all these causes, says Cazeaux, act in determining an irritation of the nervous centres of the cerebro-spinal axis, or, as says Scanzoni, through certain toxins in the blood cause an irritation of the peripheral afferent nerves which is reflected on the motor nerves of the brain and cord. This is the *reflex* theory.

Traube advanced the theory that *edema* of the brain and its subsequent anemia was the cause. Some clinical observations seem to give support to this theory; it may be said, however, that this edema would not produce eclampsia, but rather paralysis (Hippolyte).

Depaul gives good reasons for opposing the theory of reflex action starting from irritation of the nerves of the uterus in the act of parturition. He pertinently asks, Why is it that all primiparæ and rickety women are not eclamptic, for these suffer severe pains? It is not, therefore, in the uterus that we must seek the primary cause of this accident, for if eclampsia occasionally follows upon severe labor-pains, it is often developed long before the beginning of labor, or sometimes several days after. There must be some other cause or causes, as we shall presently see.

The Renal Theory.—Eclampsia, according to this theory, is caused by the pressure of the gravid uterus on the renal veins, especially in primiparæ, causing an exudation of albumin and retention of urea.

Charpentier remarks that “if certain authors profess that there is no eclampsia without albuminuria, others with no less authority are opposed to this view, stating that there are, in our days, relatively numerous cases in which there is eclampsia and no albumin is de-

tected, or it is detected only after labor: 141 such cases have been reported already." The renal theory supposes that there must have been retained in the blood some toxic substances causing the eclampsia by irritating the nervous centres, as above quoted from Cazeaux.

Therefore, the renal lesion is not constant in eclampsia. Numerous instances are also reported in which there was an absence of edema and anasarca. From this absence of edema one should not, however, always conclude that there is no albuminuria. Hence the importance of frequently examining the urine of all pregnant women, especially during the last months of pregnancy.

Eclampsia depends upon certain poisons in the blood that render it unfit to nourish properly the nervous centres. But what are these toxic principles? Is urea one? Is it carbonate of ammonia produced by the transformation of urea? (Frerichs). Are the toxic principles the extractives or coloring matters of the urine? All these questions have received affirmative answers; hence the three theories of uremia, ammonemia, and urinemia (Charpentier).

Uremia.—If Rostock, Christison, and Gregory were the first to notice an excess of urea in the blood of eclamptic women, it was Wilson who in 1833 created the word *uremia* and determined its morbid entity (Hippolyte). The word has remained, but not the theory, which contends that eclampsia is caused by an excess of urea in the blood, this excess acting as a poison to the nervous centres. This opinion, held by Wilson and others, was formally contradicted by later experiments, especially those of Claude Bernard, who proved the in-

offensiveness of urea by injecting it into the veins without causing convulsions, and therefore that urea cannot produce the nervous accidents occurring in uremia and eclampsia. Moreover, recent observations of the temperature in eclampsia (Winckel) tend absolutely to offset the uremic theory. The temperature becomes notably and progressively lower in uremia, while in eclampsia it rises in a continuous manner, and sometimes becomes very high (104°).

Ammonemia is the term applied to the presence in the blood of ammonium carbonate due to the transformation of urea under the influence of certain ferments. The ingenious theory of Frerichs, supported by several authorities, that this substance causes the eclamptic symptoms, has definitely been offset by Claude Bernard, who proved that the blood of man in health and in sickness always contains more or less carbonate of ammonia.

Urinemia.—The office of the kidneys is not only to secrete urea, but also other excrementitious principles derived from the mother and the fetus, such as creatin, creatinin, leucin, etc. (Schöffen). These or other substances accompanying the urea remain in the blood, produce its toxicity, and consequently the convulsions and coma. This theory is supported by several high authorities, who have given this condition of the blood the name of *urinemia*, by which it is now called. It is entirely accepted by Peter, who says that some pregnant women are urinemic, and that this is the reason why they are eclamptic. There is accumulation in the blood of all the elements of urine; the integrity of the renal "filter" being diminished, the deleterious action of these excrementitious substances in the blood renders the latter

incapable of regularly nourishing the nervous system. The convulsions, then, are nothing but the symptom and expression of that empoisoning of the blood. Therefore Peter proposes to substitute the term *puerperal urinemia* for that of puerperal convulsions.

Such are the principal theories advocated. Which of these theories is exclusively the true one? The last one presented seems to be the most probable. They have been thus succinctly mentioned as bearing on the important subject of the diagnosis, prognosis, and treatment of eclampsia, according as one or the other of these theories is accepted. But one fact remains certain—that in the great majority of cases albumin is found present in the urine of eclamptic women, as first noted by C. W. Lever. There remains, therefore, no reason to doubt that puerperal eclampsia is a disease resulting from an auto-intoxication of the blood, long ago called “toxhemia” by Piorry.

The late interesting researches by Prof. Bouchard demonstrate a marked *diminution* of the urinary secretion and toxicity, coinciding with an *increased* toxicity of the blood-serum, as proved in his careful experiments by inoculating animals with the blood-serum of eclamptic women. Hence the legitimate conclusion he arrived at is that the toxic products, not being eliminated by the kidneys, accumulate in the organism and act on the nervous system, especially on the medulla oblongata, through the blood, which has become the receptacle of all the poisons manufactured in the organism. The presence in the blood of these substances constitutes a true *urinotoxy*. Prof. Tarnier likewise invariably caused in a few minutes the death, with violent convulsions, of rabbits inoculated with blood-serum of eclamptics.

Rummo had already discovered that even the injection of the physiological serum of the blood was occasionally poisonous to some extent. In Tarnier's experiments the toxic character of the urine in eclamptics was demonstrated to vary inversely as the toxicity of the blood-serum, the latter being in a direct ratio to the gravity of the disease. It was also noticed that in all cases that had been bled this toxicity of the blood-serum had notably diminished and the attacks were much alleviated. This is another proof of the curative effects of venesection in eclampsia under certain circumstances, as we shall see farther on when describing the treatment.

Duration and Termination of Eclampsia.—The attack of eclampsia may terminate either in recovery or in death, or it may be followed by other symptoms. When the patient is likely to get well the paroxysms are usually few in number, of short duration, and occur after long intervals. During the intervals the woman recovers more or less completely the use of her limbs, as also of her sensorial and intellectual faculties (Cazeaux). However, her memory remains weak for some time; she may not recollect any of the incidents of the terrible ordeal through which she has just passed, and is surprised at the sight of her new-born child.

As to the number of attacks, there may be only from one to three or there may be as many as thirty or forty (Depaul), with recovery. The attacks may reach the enormous number of one hundred (Bailly) and one hundred and sixty (Pajot) in fatal cases. Their *termination* varies. Approximately 30 per cent. of the women succumb and one-half of the children are lost. More favorable results, however, are reported by some authors. For instance, Ramsbotham reports a

mortality of only 7.43 and Collins 5.30 per cent., Merri-
man 8.36, while Brumerstadt reports a mortality of
51.135 per cent. The good results obtained by the
English obstetricians are probably due to the freer re-
course to venesection—to an extent, Naegele says, that
the Germans would not dare to imitate.

Complications.—All authors agree as to the frequency
of other puerperal accidents after eclampsia. Blot has
shown that these accidents are in proportion to the pro-
fuseness of hemorrhage to which eclamptic women are
so greatly subject. They are also liable to attacks of
peritonitis, lymphangitis, phlebitis, and septic infection.
Eclampsia may also, after the attacks, lead to puerperal
mania, meningitis, and paralysis (Litzman, Depaul, Blot,
and others). Tyler Smith teaches that even the muscles
of the heart are involved in the general spasm of the
internal organs, which spasm often causes forced evac-
uation of the bowels and bladder. It extends also to
the uterus, which has been observed to rupture dur-
ing the convulsions. Hamilton, Baudelocque, Scanzoni,
and others report cases, happily rare, of this terrible
event.

Another rare accident in eclampsia is a spontaneous
rupture of the pubic symphysis. It is a well-known fact
that this separation sometimes takes place to the extent
of half an inch during hard labor in women under
thirty-five years of age. But the separation of the pubic
symphysis is reported to have taken place suddenly
during an attack of eclampsia in a primipara of twenty
years, in which case a crack was heard and the child
was easily delivered by the forceps. The separation
amounted to 1.15 inches. A leather support worn two
weeks relieved all pain and lameness (Oelschlager).

This separation was almost equivalent to that obtained by an artificial symphyseotomy.

In eclampsia there is always more or less edema of the lungs, and the congestion of the tubes caused by the convulsions may give rise to the production of a great amount of exudation, causing asphyxia by obstructing the bronchial ramifications (Bör). In one of the cases of eclampsia treated by the writer the deeply cyanosed patient was taken with a fit of severe coughing, during which she expectorated a perfect cast of the trachea and bronchial ramifications—a true specimen of what is known as “plastic bronchitis;” after the expectoration she breathed more easily, and finally recovered. The presence of this exudation, together with a great quantity of frothy mucus, shows the danger of using pilocarpin or jaborandi during the convulsive or comatose stage of eclampsia, which drugs, on account of their sialagogue virtue, as every one knows, produce sometimes an excessive secretion of saliva, by which the patient, in a state of coma or asphyxia, and unable to expectorate, is choked. Fordyce Barker reported six fatal cases from giving this drug in eclampsia.

Diagnosis of Eclampsia.—The diagnosis of eclampsia may sometimes present considerable difficulty. For instance, the physician may suddenly be called in, without having had any opportunity of informing himself as to the history of the case. The first and most important point is to ascertain if the patient be pregnant. As remarked by Charpentier, eclampsia very seldom occurs before the sixth or the seventh month, at which time it will be easy to ascertain the existence of pregnancy, and, then, if possible, the presence of albumin in the urine must be looked for.

Epilepsy.—The disease that most resembles eclampsia is epilepsy. To distinguish between them, the previous history of the patient should be learned, and whether the patient formerly had epileptic seizures. Moreover, the attacks of epilepsy recur farther apart than those of eclampsia; after either attack the patient soon regains consciousness. Epilepsy is generally ushered in by a peculiar cry, and sometimes by an aura. It is not accompanied by edema.

A most important diagnostic sign is, that in epilepsy the temperature at first rises a little and soon falls to the normal, while in eclampsia, as above stated, the temperature generally rises continuously, and sometimes attains 104° F., a very dangerous degree. Epileptic convulsions happening during pregnancy, labor, or puerperality are not in general dangerous to the mother or to the child. However, Kiwisch reported a case in which one single seizure during parturition proved fatal.

Hysterical convulsions differ from eclampsia in the fact that the patient does not become completely unconscious. The variety of body-movements, the twitching of the closed eyelids (Valleix), the ending of the attack by a paroxysm of laughing or of crying, and the voiding of a great quantity of clear (nervous) urine, sufficiently characterize hysteria. These signs are enough for the differential diagnosis. Then there is no rise of temperature, nor albumin in the urine. Hysterical convulsions may happen during gestation as well as during labor in very sensitive women, owing to a painful dilatation of the os. This uterine spasm ceases immediately after labor, and is not dangerous either to the mother or to the child (Naegle).

Apoplexy (cerebral hemorrhage, bulbar apoplectiform

congestion), which occasionally takes place during an attack of eclampsia, is characterized by the supervention of paralysis, especially of hemiplegia, and the persistence of sopor. Apoplexy in eclampsia is very seldom primary during labor (Naegele), and it may be the consequence of the obstacle to the return of the blood from the head caused by the intensity of the convulsions and compression of the jugular veins.

In the coma of uremia the temperature remains low and becomes sometimes subnormal. In cerebral tumors and concussions of the brain the temperature does not rise.

In *cerebro-spinal meningitis* there is a matutinal remission followed by a vesperal rise.

Uremic convulsions coexist with the albuminuria of Bright's disease. They may occur before labor, and do not disappear after its termination, so long as the albuminuria persists, or until the Bright's disease has terminated its course one way or the other. We should distinguish, remarks Hippolyte, between these convulsions and those of gravidic albuminuria. The temperature, when taken, will decide any doubt. In uremia the temperature is always low, even subnormal, as said above, while in eclampsia it gradually rises, becomes very high, especially in those cases that will prove fatal.

It seems to be admitted that the Bright's disease of pregnancy is owing to the pressure of the gravid uterus on the kidneys, causing in them a temporary or permanent lesion, a fatty or granular condition (Dickinson). According to this view, there is a *puerperal kidney* as well as a *cardiac kidney*, the first being the more dangerous.

Prognosis of Eclampsia.—The prognosis of eclamp-

sia is always extremely grave, especially when the patient does not recover consciousness after the paroxysms, or when these begin from the very onset of labor or when there exist obstacles to the expulsion of the fetus, such as a contracted pelvis, requiring serious obstetric operations, or when violent and prolonged attacks rapidly succeed one another. Strong and plethoric subjects run greater risks than delicate women inclined to hysteria. Diseases of the lungs and heart, and especially an advanced stage of albuminuric nephritis (chronic Bright's disease), constitute particularly dangerous complications. The persistence of a tetanic condition, with trembling of the hands, coldness of the extremities, a sunken appearance of the features, frequency and smallness of the pulse, and the extension of the pulmonary edema, are invariably signs of a fatal termination. But, on the contrary, if the convulsions do not begin until toward the end of the period of expulsion, and this is rapidly terminated by nature or easily assisted by art, if the paroxysms become shorter and moderate in intensity, and if the patient becomes conscious after every attack, an appropriate treatment will often save the mother and the child.

Everything considered, eclampsia is less dangerous when taking place after labor and during puerperality, unless the disease be due to an advanced stage of Bright's disease, as stated above. Bör states that women with a marked osseous and muscular system as a rule never recover. However, all hopes of saving the patient should not be lost, even if she has had intense and rapid convulsions at the onset of, or before, labor. Naegele reports a case in which the woman had thirty-two severe convulsions before labor, remained unconscious for two

days, and yet she completely recovered. This is, however, a rare termination of eclampsia. Death seldom takes place during the paroxysms, but occurs during the comatose stage.

The danger to the child is even greater than that to the mother, the child generally dying during the first convulsions; from one-half to two-thirds of the children die. Their placental respiration being cut off by the uterine spasms, they die of asphyxia, and possibly also from the poisoning of their blood owing to the excrementitious matters in their circulation (urinemia). They are frequently found spasmodically contracted, and often soon die convulsed. But if the labor in eclampsia is short or is easily terminated by art, some of the children may be saved, although they are liable to die in a few days (Litzman).

Treatment of Eclampsia.—The treatment may be prophylactic and begun during the last months of pregnancy. When there is considerable edema of the face and much albumin existing in the urine, this is sufficient cause to fear a coming attack of eclampsia, and preventive measures should at once be adopted.

PREVENTIVE TREATMENT.—Whereas eclampsia is doubtless connected with albuminuria, the best way to prevent eclampsia is to combat the albuminuria. “My practice,” says Charpentier, “is to adopt an exclusively milk diet, to be continued for weeks and months if necessary. In order to succeed you must overcome the resistance of the patients, who are inclined to give up this diet as soon as they feel better. So long as there is albumin in the urine, this treatment should be continued in its integrity, even for some time after the disappearance of the albumin, the patient being finally permitted to re-

turn very gradually to her ordinary diet. The urine should be examined every four or five days, and the treatment begun again in its severity if the albumin reappears. When the albumin has disappeared for a week, begin a course of tonics, preferably preparations of bark, iron, and gentian, and regulate the bowels with mineral laxative waters, such as Rubinat-Condal, Hunyadi Janos, etc. We have seen this treatment almost always successful in our practice, even in cases in which the anasarca and the albuminuria of the patients were extreme."

In cases in which the above preventive treatment fails we must have recourse to venesection to the amount of 10 or 12 ounces of blood taken from the arm. This is the course followed by Cazeaux, Depaul, Tarnier, and Peter. Naegele recommends mild diuretics, such as lemonade, cream of tartar, and warm-vinegar baths. Braun prescribes vapor-baths and Vichy water.

Unfortunately, all the above means will sometimes fail: the albumin persists and the puffiness of the face remains; the quantity of urine solids becomes less and less; there exist disturbances of vision, cephalalgia, and epigastric pains. Under these very threatening circumstances the woman should not be permitted to run the risk to herself and the child from acute renal insufficiency, and premature labor should be resorted to. Many authorities express this opinion; for example, Martin, Lohlein, C. G. Jennings, and Tarnier advise the operation under the following conditions:

1. That the patient must have arrived at the eighth month, in order to give a better chance for the child to be reared;
2. That the albuminuria must have reached a high

degree or the patient present some precursory signs of eclampsia ;

3. That the woman must be a primipara or have had attacks of eclampsia at some preceding labor ;

4. That the inefficiency of medical treatment, and especially of bloodletting, have been proved (Tarnier).

Under these conditions the induction of premature labor appears rational, in order to forestall an imminent attack of eclampsia. (See chapter on *Induction of Premature Labor*.)

CURATIVE TREATMENT OF ECLAMPSIA.—Stricken by the convulsions as by lightning, and without premonition, the patient will frequently fall while walking, will become unconscious, and be exposed to the same accidents as in epilepsy—wounds, burns, etc. The dorsal decubitus is therefore necessary—a position which the patient will generally maintain naturally during the convulsions, no great force being required to control her. The protrusion of the tongue between the teeth may be prevented by means of a folded towel or a spoon wrapped in some linen and placed between the teeth during the attack. The emptying of the bladder with a catheter should be attended to, although very little urine will be found.

ANTIPHLOGISTIC AND ANESTHETIC METHODS OF TREATMENT.—Each of these methods counts among its supporters ardent advocates and no less violent opponents.

1. *The Antiphlogistic method* consists in general and local bloodletting, purgatives, and revulsives. *General bloodletting* is the oldest method, and counts among its supporters Mauriceau, Dewees, Burns, Hamilton, Baudelocque, P. Dubois, Cazeaux, Gross, and especially Depaul and Peter. Among its opponents must be named

Braun, Kiwisch, Litzman, Legroux, Thomas, Churchill, and Veit.

Unless the labor has reached the period of expulsion, which permits it to be easily terminated by the intervention of art, the treatment must begin by the abstraction of from 16 to 30 ounces of blood, taken from the arm through a large opening, allowing the blood to flow very freely, *pleno rivo*. The quantity of blood to be taken depends on the condition of the patient. If she be strong and plethoric, bleed freely, especially if there be much congestion of the head. In general it is better to take too much blood than too little, and one should not be deterred by the apparent smallness of the pulse nor by the livid paleness of the face. As the blood flows the pulse will become stronger (Naegele).

General observation proves that venesection, unless contraindicated by a real state of anemia or of hydremia, is of the greatest utility in eclampsia by its powerful impression on the nervous system. It guards also against pulmonary and cerebral hyperemia, apoplexy, and edema, which are the result of the convulsions, and not their cause. At the same time sixteen to twenty leeches are to be applied to the temples or wet cups to the nape of the neck, and the flow of blood should be encouraged for some time. If the convulsions and the cyanosis continue, repeat the venesection after six or eight hours.

All authorities recommend also ice-cold cloths or ice-bladders to the head, stimulating enemata, warm-vinegar baths or sponging (Naegele). Ten grains of calomel, or 3 drops of croton oil put on the tongue, or elaterium, pure air in the room, and the removal of tight dresses or lacing are also advisable. In some cases very good results have been obtained from a general tepid-water bath,

acidulated if possible with vinegar, or by sponging the body with the same, while continuing the cold affusions to the head. The patient should then be put in bed and be covered with warm blankets. Trousseau recommends the digital compression of the carotids; this is useful, but rather fatiguing.

The advantages of bloodletting have been testified to by so many authorities that the objections lately raised against it can hardly be taken into consideration. The value of the method is shown by the successful results so clearly obtained by English obstetricians, who draw such an enormous quantity of blood that the Germans would not dare to imitate them, as stated by Naegele, who recommends the above treatment, and who is a safe authority. In this respect the French are not behind the English; for instance, Depaul in the case of plethoric women does not hesitate to make them lose from three to four pounds of blood in a few hours. Dewees, inspired by the French school, proposed bleeding after every attack. Hamilton, an Englishman, advises a bleeding of three pounds, to be repeated if necessary. Pajot is not an advocate of this method, which he reserves only for strong, plethoric women. Pajot's opinion is also that of Braun.

There are other authorities who adopt a mixed course of venesection and anesthetics. Clinical statistics, quoted by Charpentier, prove that there are better results obtained from moderate than from very copious venesection. Among the Germans, Spiegelberg claims that venesection lowers the arterial tension, diminishes the irritation of the vasomotor and convulsive centres, and restores to the kidneys their normal functions.

In America, discarding the teachings of the old mas-

ters—Dewees, Byford, Fordyce Barker, Hodge, Gross, as well as of Lusk—and of the whole English and French schools, and swayed by the modern German authorities, the lancet has almost entirely been laid aside. How many of those who read this book possess a lancet and have been taught how to use it? We do not bleed now because we do not know how to bleed properly.

The advantages of venesection lie especially in its rapid action, incidentally favoring absorption and rendering the patient more susceptible to the influence of other remedies. Venesection forms, therefore, the first step in the treatment of convulsions (Lusk). After bleeding, chloroform and narcotics should be used with a view of preventing the return of the convulsions (Lusk).

Happily, within the last few years a reaction has begun in favor of venesection, notwithstanding prevalent opposition, and this “lost art” is gradually finding its place in the treatment of eclampsia and other acute diseases. Some practitioners have, however, never lost the “art.” As an example, in this city (St. Louis) a few years ago lived an old physician, Dr. Philips, whose practice was to bleed for almost every disease—a true Doctor Sangrado. An excellent obstetrician, also of this city, was suddenly called to a female patient of Dr. Philips during the doctor’s temporary absence, and he found the woman with a frightful attack of eclampsia. Tying her arm, he immediately bled her to the extent of 30 ounces of blood. Dr. Philips then came in, and the case was of course returned to him. A few days afterward the two physicians met on the street, and the obstetrician in question asked Dr. Philips how the patient was. “Why,

she is well now," he answered.—"You see," said the other, "that my bleeding saved her life."—"Your bleeding?" said Philips. "As soon as you left I opened another vein and bled her to the amount of 60 ounces more! That is what saved her life."

Pilocarpin.—Saenger, who thoroughly examined the claims for this drug, came to the conclusion that pilocarpin is not primarily an ectrotic agent—that it does not awaken uterine contractions, but reinforces and regulates them when once begun. It acts chiefly as a sialagogue and sudorific. The production of saliva, being sometimes excessive, threatens the patient with suffocation, as she is unable to expectorate during the comatose stage. Pilocarpin is therefore unsafe and should not be used. Fordyce Barker, as above mentioned, employed it in six cases with nearly fatal results. Its antidote is atropia. Pilocarpin should be used only as a galactagogue, as it succeeds very well in promoting the secretion of milk. The success in some of the cases of eclampsia treated by pilocarpin is due to the fact that other means had at the same time been resorted to, such as bleeding, chloroform, the provocation of labor by bougies, etc., so that it is difficult to judge of the part it had in the reported cures.

Veratrum viride has also lately been presented as a remedy for eclampsia. Dr. H. Fearn of Brooklyn proposed and employed it as a substitute for bloodletting in puerperal convulsions, in doses varying from 15 minims to a teaspoonful (?), repeated every five or ten minutes until the pulse becomes soft or vomiting sets in. He claims that these large doses are devoid of danger so long as the convulsions continue (Kenyon). Further reports of investigations and clinical observations are

required to prove the value of this powerful but dangerous drug.

2. *Anesthetic Method*.—Three agents have especially been employed—ether, very soon replaced by chloroform, and the hydrate of chloral.

Ether, either alone or associated with narcotics, requires greater quantities than chloroform, and it frequently causes vomiting or edema of the lungs, and increases interstitial nephritis when this already exists. The French, English, and Germans reject ether, although its use is still kept up in some few places in America. Moreover, statistics show unfavorable results: 40 per cent. of the cases in which ether was used have proved fatal, although it is reported that in some cases it has caused the diminution and cessation of the attacks. These were probably cases chiefly of hysteria or of very mild eclampsia.

Chloroform has given surprising results in the hands of some observers. It does not, however, cure eclampsia, which is caused by certain poisons in the blood; it only prevents the irritation by the poison of the cerebro-spinal axis, the integrity of which it preserves, thus checking the explosion of the convulsions and their dangerous results, such as cerebral or pulmonary edema and apoplectic effusions (Barquissou).

Rejected entirely or accepted with much reserve by Depaul, Pajot, Tarnier, Guéniot, Bailly—in a word, by the majority of the French obstetricians—chloroform is strongly advocated by Scanzoni, Braun, Spiegelberg, Kiwisch, and the whole of the German and English schools. Most American obstetricians use chloroform to-day, and it has proved of such signal service in eclampsia that it is now very frequently used, either alone or jointly with

morphin, reducing the mortality to 30 per cent., which is a favorable result.

To administer chloroform, one should have, if possible, as an assistant an experienced anesthetizer. Remove false teeth, which the patient might swallow and thus be choked to death; remove all rings. Give the chloroform, poured drop by drop very slowly on a handkerchief placed over the patient's mouth. This method is better than the use of the most improved inhalers; it allows of admixture of air.

Chloroform Narcosis.—Give the chloroform at the onset of every convulsion. Suspend it if the patient becomes livid. Watch the respiration, as its becoming irregular is the most important sign of danger (Report of the Hyderabad Commission). In case of great danger immediately invert the patient with her head touching the floor. This is the best method of resuscitation in case of chloroform narcosis. It was successfully performed in the following case by Sims and Nélaton: Sims was operating in Paris for vesico-vaginal fistula, Nélaton assisting. When fully under the influence of the chloroform the woman turned ghastly pale and ceased to breathe. "She is dead!" exclaimed Sims. "No," said Nélaton; and, taking hold of the patient, he threw both her legs over his shoulders and let her head reach the floor. In a few moments she began to breathe and color returned to her cheeks. She was replaced on the table and the interrupted operation resumed. Within a few moments the same accident recurred, and she was restored to consciousness through the same measures. "How did you learn this method?" asked Sims. "From my little son," answered Nélaton. "'Papa,' said the little fellow, 'I give chloro-

form to mice, and when they are dead I take them by the tail and whirl them quickly around.'” This trick of the child produced a centrifugal rush of blood to the respiratory centres of the brain, which had become anemic during the chloroform narcosis. When the anemia is too deep life may become extinct. Singularly enough, no well-authenticated death from chloroform in labor has been reported, for the reason that the throes of labor cause an active congestion of the brain, as shown by the throbbing carotids and the puffy and red appearance of the face. Should the woman be anemic or neurotic, the danger would, however, be greater.

We believe, says Charpentier, that chloroform should not be adopted in an exclusive fashion nor absolutely be rejected, and that if chloroform fail in a great many cases, there are other cases when it can render notable service. Depaul, who is a strong opponent of the indiscriminate use of chloroform, states that its full anesthetic dose in eclampsia has several times proved fatal by intensifying the state of coma and cyanosis. Except in cases when labor is nearly at an end, the giving of chloroform should be restricted to the period of pains and restlessness which are often the preliminary of a fresh seizure (Lusk).

Venesection should always be practised for the relief of head-symptoms, and afterward the agents used should be opium, chloral, the bromids, and digitalis (Lusk). As these patients are not unfrequently subject to dangerous post-partum hemorrhages, venesection, if resorted to after delivery, may still further weaken and predispose them to puerperal mania (Winckel) and puerperal paralysis.

Venesection, after all, must be admitted to be the chief reliance in the treatment of puerperal convulsions. As stated above, unless the patient be evidently chlorotic or

hydremic, the first step to be taken is to bleed freely from a large opening in the vein, *pleno rivo*. The amount of blood to be taken should vary according to the patient's strength and condition. In ordinary cases from 16 to 30 ounces are not too much. If the convulsions return at very short intervals and the face remains livid and cyanosed and the patient comatose, the bleeding should be repeated in from four to six hours; at the same time, leeches, twenty to thirty in number, and ice-water on cloths to the head, must be used. Trousseau, as stated above, recommends also compression of the carotids, which gives temporary relief and guards against the consequences of turgescence of the brain, such as probable apoplectiform effusions. This turgescence is not the cause, but the effect, of the convulsions. The pulse, as stated above, which before the bleeding was sometimes small, will rise and become fuller as the blood flows (Naegele). But in moderate convulsions and in those at long intervals, without the above-mentioned brain-symptoms, venesection is not so much indicated, or only in great moderation if at all.

Chloral-hydrate Treatment.—Now a very valuable remedy comes to our assistance: it is *chloral hydrate*, whose favorable effects are sometimes wonderful. It should be administered by the rectum, the injection consisting of from 75 to 100 grains of chloral in 4 ounces of mucilage or of milk, the retention of which may be secured by pressing firmly against the anus with a cloth wrung out of ice-water; this produces a spastic contraction of the anus, thus preventing the evacuation of the injection, which should be repeated in four hours if needed.

Charpentier gives his method of administering chloral as follows: "We at once give an enema containing 60

grains of chloral. Whether the convulsions cease or continue, we wait then four or five hours and repeat the same amount, and seldom give beyond 4 drachms in all during the day; which dose is very seldom required. But we do not cease this treatment at once, and even after the cessation of the attacks we always give 1 drachm of chloral at the end of the first twenty-four hours, counting from the beginning of the convulsions, in order to guard against their recurrence." This is the practice followed by the writer, preceding it by venesection. The amount of this bloodletting should be proportioned to the patient's strength. Lucas-Championnière denies the danger of chloral and chloroform in surgical operations on persons having cardiac affections; Waters, Ogles, Peyers, and Westrangle support his opinion.

The very conclusive statistics tabulated by Testut prove the great value of chloral in eclampsia. In the mixed treatment by bleeding and purgation the mortality proved to be, in his statistics, 17.3 per cent.; with anæsthetics, 17.8; with chloral alone, 4; chloral and bleeding, 9.10 per cent.; general results of chloralic treatment, 8.19 per cent. mortality, bleeding alone showing 30 per cent. mortality.

Opium Treatment.—Many modern German authors, especially Brummerstädt, have great confidence in opium in feeble and anemic women. On account of the patient's inability to swallow this drug, it should be administered subcutaneously in the form of hypodermatics of the sulphate of morphia, given very energetically and at once (as recommended by the above authority) in doses of 1 grain after every attack until the production of narcotism, which is to be kept up for some time after the last attack.

Kiwisch and Braun are much in favor of this method, especially if combined with inhalations of chloroform.

OBSTETRIC TREATMENT OF ECLAMPSIA.—All experience teaches that the delivery of the child has a marked effect in causing the cessation of the convulsion. Hence all obstetricians agree that the labor should be terminated as speedily as possible consistently with the safety of the two lives concerned. Therefore, when the orifice is completely dilated, the membranes ruptured, and the head low enough, we should terminate the labor by the forceps, or by version when indicated. In fact, the convulsions will often persist until this operation be accomplished, and sometimes after the child's birth, as stated before. No forced labor should be attempted, as this additional irritation will aggravate the convulsions. If there be much amniotic fluid and the head presents, the tense membranes pressing on the undilated os, the bag should be ruptured early, contrary to the ordinary rule. This measure will diminish the tension of the uterus.

But if the os remain undilated and undilatable, and the labor-pains have not begun, while the convulsions continue unrelieved after free venesection and a liberal use of chloral, chloroform, and morphia or opium, what then should be done? The provocation of premature labor should be performed rapidly by the Krause method—namely, a sound introduced for 8 inches in the uterus between the membranes. (See *Induction of Premature Labor*.) Delivery should be facilitated by multiple small incisions all around the undilated cervix (Depaul) and by digital dilatation; and as soon as the cervix is dilated enough the forceps should be used on the head, or version be performed if a shoulder or the trunk presents.

If not successful in three or four hours, with the con-

vulsions intense and threatening the woman with rapid death from asphyxia and cyanosis, and the os undilated, there is naught else to do to save life except to perform a Cesarean section, the stubborn rigidity of the os precluding the thought of a symphysectomy.

Summary of Treatment.—1. In grave albuminuria before labor, an exclusive milk diet and moderate venesection if there be serious head-symptoms or disturbances of vision.

2. If, notwithstanding these measures, the convulsions appear, take from the arm from 16 to 30 ounces of blood, use chloral in doses of 1 drachm as an enema and repeat in four hours; also moderate inhalations of chloroform during the attacks.

3. The labor having set in, terminate it as soon as possible by forceps or by version, or, under very rare circumstances, by the Cesarean operation.

4. After the delivery, if there be convulsions, use chloral, and, if needed, chloroform, during the attacks. This is Charpentier's method, which is adopted by the advanced obstetricians of to-day. It proves most successful in their hands, and shows by reliable statistics fewer deaths than any other method.

CHAPTER XII.

PUERPERAL INSANITY AND PARALYSIS.

Puerperal insanity is one of the pathological affections caused by eclampsia and by severe and protracted

labor. This disorder may affect the operations of the intellect, the sensibility, and the will, and in some persons manifest itself by mania, in others by melancholia or monomania. According to Marie, the intellectual disturbances to be observed in the pregnant woman vary in character and intensity from a mere change in her ordinary temper to the most violent display of mania.

Soon after delivery, or during it, the patient will lose all control of herself, especially if the labor has been prolonged and severe; she will at times assume a dramatic expression, and, speaking in a most disorderly manner, will sometimes break forth into the wildest recitation of stanzas of poetry; at other times she will pray in tones of anguish and fear, speaking of unshriven and unpardonable sins, and expressing great fear of eternal damnation. At other times she will sing, sometimes beautifully, the melodies she knows. Cazeaux relates that he attended a young primipara during a lengthy and severe labor. She suddenly ceased to complain, and after a few incoherent phrases began to sing in a full voice the grand aria of *Lucia di Lammermoor*. "I cannot express," says he, "the terrifying effect produced by this song on myself and attendants." A bleeding, followed by an immediate application of the forceps, had the effect of calming the patient, and there was no recurrence of delirium; in fact, she was saved from an imminent attack of eclampsia.

This delirium will on other occasions terminate in an attack of acute mania, in which the patient becomes dangerous to herself, to the attendants, and especially to the child, which in her frenzy she may try to strangle by laying violent hands on the extruding head, which she endeavors to pull away. The writer once saw a distressing case

of this nature. A young seduced girl was taken with labor, and, unassisted, in a butcher's shop, she delivered herself on the counter, and, seizing a large knife within her reach, she severed at one stroke the child's neck. The noise she made attracted attention, and she was found in a pool of blood, the severed head of the child lying on the floor. She could give no account of how all this had happened. In the agony of her pains she had instinctively enacted this frightful tragedy. There is here a very interesting medico-legal point, for if under these circumstances the girl had been tried for infanticide, no jury would have returned a verdict of guilty.

The above are instances of temporary insanity caused by the intensity of the pangs of parturition. It may, however, be remarked that the patients usually recover soon from these attacks of acute mania.

But frequently insanity follows puerperal convulsions immediately after labor, and this form of alienation, at first maniacal, assumes a melancholy character, and finally ends by becoming chronic, and often incurable, causing the patient to be confined in an insane asylum for months, perhaps for years.

Among the delirious ideas of the patient, those of an erotic nature have attracted the attention of several observers, who have given to them a special importance. Albumin has also been noticed in the urine, as well as a peculiar odor emanating from the patient, who presents a characteristic facies (Marie). The patient also manifests complete insomnia, and has a loaded tongue, intense cephalalgia, a rapid pulse, hallucinations of hearing and of sight, photophobia, and a most violent agitation, sometimes leading her to commit suicide or to attack those about her.

Frequency.—Puerperal insanity is not a very rare accident. From reliable authorities—Esquirol, Reid, Kirkbride, McDonald, Webster, and others—it appears that out of 9179 cases of insanity cited by these authors, 622 were due to puerperality; that is, 1 in 14.7. Among some of the above cases a few originated during gestation and lactation. Puerperal insanity was shown to be more frequent among multiparæ than among primiparæ in the proportion of 4 to 1.

Prognosis.—The physician's prognosis should be guarded and in accordance with the various forms of the affection. The mania of puerperal women is often incurable, and occasionally ends in sudden death. The prognosis is more favorable in melancholia and monomania.

The child, for which the mother in her frenzy has the greatest abhorrence, should be taken away, as she might endeavor to strangle or suffocate it, as said above.

Treatment.—When the patient is acutely maniacal, recourse should be had to venesection; cups or leeches should be applied to the head. Cold affusions, nauseating doses of tartar emetic, veratrum viride, prolonged warm baths, and, after the excitement has somewhat subsided, the use of chloral, chloroform inhalations, and antispasmodics, should be resorted to. Opium has successfully been employed by some. The labor should be terminated as soon as possible—by art if necessary. The mortality of the children is very great in these grave cases.

Puerperal Paralysis.—This affection occasionally follows eclampsia and severe labors. It presents itself in various forms, among which are hemiplegia, paraplegia, facial paralysis, amaurosis, and bulbar apoplectiform con-

gestion, the latter being produced by the strain of a severe labor. But as these affections fall more properly within the domain of the alienists and neurologists, they will not be treated of here, and should be studied in treatises on neurology. Charcot may be consulted with profit.

CHAPTER XIII.

RETROVERSION, RETROFLEXION, AND SACCIFORM DILATATION.

Retroversion and Retroflexion.—Retroversion is a change in the *position* of the uterus (Fig. 23); retroflexion is a change in the *form* of this organ. These versions are frequently combined. Retroversion takes place in the third month of gestation, at the time when the uterus begins to rise out of the excavation. At this period the retroverted fundus strikes against the promontory of the sacrum, which it cannot clear, and frequently abortion is the consequence.

Causes.—Many causes are capable of producing this accident, such as raising weights, efforts at defecation, excessive dilatation of the bladder, pelvic tumors, and fibromata of the body and posterior part of the uterus, adding to the weight of this organ.

Diagnosis.—After a complete catheter evacuation of the bladder, the abdominal cavity, on palpation, is found empty, the region of the bladder gives a tympanitic sound, and the fundus of the uterus cannot be found even in the depth of the pelvis. On internal exami-

nation the cervix is noticed to be very high and behind the symphysis pubis; the anterior wall of the obstetric canal is vertical, the posterior wall bulges forward, and the excavation of the sacrum is filled by a round,

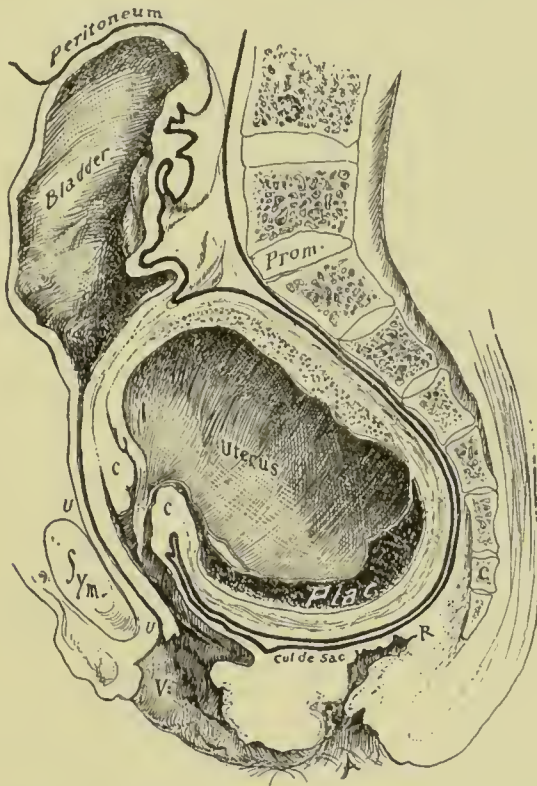


FIG. 23.—Frozen section of retroverted uterus at three and a half to four months. Death from rupture of bladder (*Arch. f. Gyn.*, Band xli., Taf. 8, f. 1).

elastic, and moderately firm tumor, formed by a part of the body and fundus of the uterus firmly compressing the rectum. If there is also *retroflexion*, the neck is found bent and turned backward. It is sometimes very difficult to make a differential diagnosis between an incarcerated pregnant uterus and an extra-uterine pregnancy or a retro-uterine hematocoele. The latter would be recognized by an exploratory incision, the

former by a thorough bimanual examination under chloroform.

The prognosis depends upon the duration and degree of the accident: when slight, the uterus replaces itself spontaneously if the bladder and rectum are carefully kept empty. Otherwise, the continuation of the affection may occasionally prove fatal to the mother and the child. Shinner reports 63 cases with a maternal mortality of 15 and a fetal mortality of 20, which shows that this is a very grave affection.

If great difficulties be met in the attempt at reposition, it is to be feared that abortion will take place sooner or later. In old neglected cases very great difficulty in micturition takes place, and other symptoms soon become alarming. The uterus has become *incarcerated*. The patient feels a constant desire to urinate, but does not completely empty the bladder, which becomes dilated to an enormous degree. Defecation becomes painful or impossible. The patient, if not quickly relieved, shows symptoms of inflammation of the uterus and the bladder. There develops cystitis of the gravest form; exfoliation of the lining membrane of the organ, and even diphtheritic exudations, may be present and be followed by gangrene. A high fever sets in. Delirium and all the symptoms of uremic intoxication appear. Death may be produced by general peritonitis, caused by the bursting of the bladder and by urinary infiltration into the peritoneum. There has been reported a case of rupture of the uterus, with escape of the fetus into the abdominal cavity (Salmon). Nature sometimes comes to the aid of the patient by a spontaneous abortion.

In any case resort must be had to emptying the bladder by the catheter—an operation frequently very difficult,

because the urethra is quite high above the pubis, and sometimes bent upon itself at a right angle. In obstinate cases the patient should be placed on her knees and chest, and the finger be made to pass up the anterior wall of the vagina. A long and somewhat hard (English) catheter should be selected. Shreds of diphtheritic membranes may obstruct the eye of the catheter and prevent the urine from flowing, in which case the eye should be cleansed with a stylet.

Treatment.—The treatment must be conducted according to the degree of the accident. In moderate and recent cases rest in the horizontal position and the regular emptying of the bladder and rectum will suffice to produce a spontaneous replacement of the organ, as occurred in 65 of the 75 cases reported by Busch.

But in grave cases with symptoms of *incarceration* the bladder and the rectum should be emptied, the latter by a castor-oil enema through a long tube passing behind the body of the uterus. This is the advice given by Cazeaux and endorsed by Scanzoni. Immediately afterward the *reduction* of the organ should be proceeded with, preferably through the rectum. The patient being placed on her knees and chest, two to four fingers, well oiled, gently but firmly press the fundus in the direction of the axis of the pelvis until the fundus is felt to pass the promontory of the sacrum. This mode of reposition has successfully been followed by eminent obstetricians—Scanzoni, Kiwisch, Krause, and others. In case of great irritability of the rectum the patient should be chloroformed.

Several ingenious instruments have been devised for this reposition, such as a bladder or a large Barnes bag introduced into the rectum empty and afterward inflated,

the bent handle of a large spoon, and the writer's recto-uterine repositor, which is a narrow lever so bent as to follow the curvature of the sacrum until it passes the promontory, the patient being in the knee-chest position. The extremity of this lever is gently pushed in until it passes behind and beyond the body of the uterus, which is then repositied by a sort of leverage movement, a suitable pessary being introduced before the patient is allowed to resume her ordinary position, lying preferably on her abdomen or side for a few days. A Sims vaginal depressor, properly bent, may fulfil the same purpose, or an Evrat drumstick may answer in place of the Sims instrument.

In case of failure by the above methods the uterus should be punctured posteriorly, and enough of the liquor amnii evacuated to permit the reposition of the uterus by one of the above methods. This puncture of the uterus may be an *indirect* means of interference with the pregnancy, but is not necessarily followed by abortion, as is proved in the case cited from Dr. Ingleby in the chapter on *Dropsy of the Amnion and Hydatiform Mole*.

It is proper to observe that all these instruments are more or less dangerous unless handled with a great deal of caution and gentleness, and that, after all, the hand, with the patient on her knees and chest, will generally succeed. When it is absolutely impossible to introduce a catheter into the bladder, it has been recommended to puncture this organ on the linea alba just above the pubic symphysis, at a point where there is no risk of wounding the peritoneum, using for this purpose a cannula connected with an aspirator.

Symphyseotomy, or even gastrotomy, should be per-

formed in desperate cases of retroversion or incarceration of a gravid uterus.

Sacciform Dilatation of the Uterus.—In the development of the uterus certain parts grow proportionally more than others; generally it is the anterior region, but exceptionally this growth takes place at the posterior wall of the uterus. In this case the fetal part engaged in the excavation must necessarily push before it that posterior segment of the uterus (Fig. 24). The neck of the uterus, instead of being directed backward, is directed forward, and is to be found behind the pubic symphysis (Depaul).

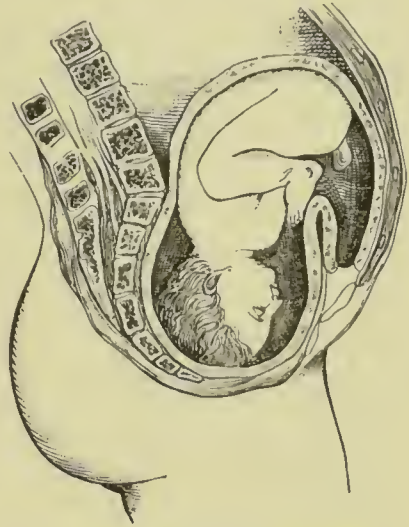


FIG. 24.—Sacculation of the uterus (Oldham).

It was Mende who first spoke of a *true* and a *false* retroversion (1825). Kiwisch and Scanzoni accept this distinction, and say that a partial apparent retroversion taking place in the latter months of gestation is due to the fact that the posterior part of the uterus sinks as a sac or diverticulum into Douglas' cul-de-sac, and the softened uterine parenchyma is forced back by the child's head, which it covers as a spherical cap. This form is observed only in the last two months of pregnancy (Scanzoni).

Depaul, who described best this condition, and from whose able essay most of the above remarks have been taken, at once eliminates all the traits belonging to retroversion proper, since retroversion takes place in the

first months of gestation, while sacciform dilatation occurs in the last two months.

Diagnosis.—By palpation the anterior part of the uterus does not feel so uniformly projecting and rounded; it is somewhat flattened. If the membranes are ruptured, the fetal inequalities are apparent. By the touch the posterior uterine segment is shown to be largely developed, and to have taken possession of all the available space in that region of the excavation. The anterior cul-de-sac is very short, contrarily to what exists in the normal state, and cannot be reached except by the whole hand, even under chloroform, and catheterism of the distended bladder is very difficult, except with a very long catheter. *The differential diagnosis* must be made from all the varieties of pelvic tumors, from retro-uterine hematocele, and from extra-uterine pregnancy.

Prognosis.—The prognosis is very serious. When the deviation of the uterine neck is only moderate, the labor, although very long, may terminate fortunately by a spontaneous gradual cervical dilatation, which will permit the passage of the child, especially if it presents by its pelvic extremity. However, the life of the child is almost always compromised. But when the neck is drawn much forward and above the pubic symphysis, the difficulties are much increased. The fetal part contained in the posterior diverticulum or sac receives the full force of the uterine contractions, which force the tumor lower and lower. The neck, placed beyond the sphere of uterine activity, does not dilate even after several days of labor (Charpentier). The uterine tissue becomes inflamed, and even gangrenous; metritis and peritonitis may be the consequences of this forcible labor. The patient becomes exhausted. After the membranes have been

ruptured for several days, this unfortunate situation may be further aggravated by putrefaction of the ovum ; yet most of the women have survived this terrible ordeal.

Treatment.—An attempt should be made to reach the cervix and hook it down. If the child presents by the feet, the latter should be seized, drawn down, secured by a tape around the ankles, and the body extracted as soon as dilatation permits. Multiple incisions should be practised around the rigid neck, version should be performed when demanded, if possible, and as a last resource hysterotomy through the inferior segment of the womb should be performed.

In a case presenting this condition, Dr. E. L. Feehan, a skilful obstetrician of St. Louis, succeeded in safely delivering a woman by the combined-version method of Braxton Hicks ; both mother and child recovered. Sac-ciform dilatation is, fortunately, of very rare occurrence.

CHAPTER XIV.

DROPSY OF THE AMNION AND HYDATIFORM MOLE.

Dropsy of the Amnion.—There are scarcely any obstetricians who have not observed the loss of unusual amounts of liquor amnii during labor without any injury resulting to the mother or the child. But it may happen, under certain morbid conditions, that the collection of amniotic fluid attains very abnormal proportions, which by some authorities are reported to have reached from 10 to 60 pints. An immense distention of the womb

then takes place, thus causing very serious symptoms, such as asphyxia, cyanosis, etc. Even the death of the woman may occur from this great dropsical effusion, which usually shows itself at the seventh or the eighth month of pregnancy, and which then requires immediate interference in order to avert the impending peril to the woman's life.

Puncture of the Membranes.—A puncture of the membranes should be made with a stylet or a catheter. This puncture should be made above the cervix, as high as possible, and the waters be allowed to drain off very gradually, their escape being slowed by pressing the ends of two or three fingers cone-like against the os. The sudden emptying of the uterus is prevented in order to save the woman from the dangers of inertia of the womb, the contractility of which is at times thus impaired, permitting profuse hemorrhage; also to make the removal of pressure on internal organs, such as the liver and kidneys, very gradual. By letting the water drain off slowly the danger of syncope, such as may happen after paracentesis of the chest or of the abdomen for dropsy of these cavities, is avoided. A safe method recommended by Guillemet is to glide the catheter between the ovum and the uterus, so as to pierce the membranes at a point above the neck, thus controlling the discharge of the fluid and withdrawing only what is in excess. The puncture of the membranes is not necessarily fatal to the child, even when done at the fifth or the sixth month of pregnancy. This fact is certified to by several authorities. In confirmation of this view Ingleby relates the following case: A lady, six months advanced in her third pregnancy, lost a great quantity of water suddenly during the night.

From this moment until the termination of pregnancy there escaped one and a quarter pints of fluid every two or three days. The woman was delivered of a large living boy, and the after-birth was spontaneously expelled. "I received it in my hand," says that writer, "so as to avoid laceration of the membranes. I examined it with the greatest care, and discovered, besides the opening made by the head in the centre of the membranes, a second opening of circular form near the edge of the placenta. It was doubtless through the latter that the fluid escaped from time to time." Whenever the neck is inaccessible the puncture should be made through the vagina. As to the causes of dropsy of the amnion, many theories have been advanced, and they show a great lack of unanimity. This affection is not very rare, as there is reported 1 case in 150 labors.

Prognosis.—The prognosis is generally favorable to the mother, while 50 per cent. of the children are lost. It should be stated that the latter are frequently premature, and in some cases tainted with syphilis or affected with hydrocephalus or other deformities. According to McClintock, 70 per cent. are females.

Differential Diagnosis.—The presence of *twins* may be taken for a case of hydramnios, but the rational and physical signs of twin pregnancy will make the diagnosis clear. In hydramnios the form of the abdomen is more globular and more uniform, the vertical diameter of the uterus is more marked than the transverse diameter, and *ballottement* is easier than in twin pregnancy. The diagnosis from *ascites* may present greater difficulties, especially from ascites complicating pregnancy. In ascites the abdomen is flattened and spread out laterally, while percussion anteriorly gives a tympanitic sound, due to the

presence of the intestines, which float above the liquid. The dulness changes in accordance with the position given to the patient, the resonance always occupying the uppermost part of the abdomen. In hydramnios the dulness exists all over the abdomen. But if there are at the same time hydramnios and ascites, the diagnosis becomes more difficult. In this case the vaginal touch would show obliteration of the neck, the size of the uterus would be increased, and *ballottement* could be elicited, while the above-mentioned signs of ascites would coexist. Cases of this sort have been mistaken for *ovarian cysts* and have been tapped. Ovarian cysts begin on one side of the uterus, which is displaced to the side unoccupied by the tumor, and the certain signs of pregnancy are absent.

Diagnosis of Dropsy of the Amnion from Hydatiform Mole.—The possibility of mistaking a case of hydatiform mole for one of pregnancy with hydramnios arises from the fact that in both there would be a rapid growth of the abdomen out of proportion to the supposed stage of the pregnancy. But in the former case there would be alternations of small hemorrhages and watery discharges almost throughout the whole course of the case, terminating in a profuse loss of blood and discharge of vesicles, amounting sometimes to a pailful. After this evacuation all symptoms disappear and the patient is restored to health.

Hydatiform Dropsy of the Villousities of the Chorion, or Hydatiform Mole.—*Symptoms.*—This tumor induces an early exaggerated increase of the abdomen, so that the woman appears to be five or six months pregnant. This increase may give rise to unjust suspicions, as the tumor may take place in the virgin (though

this is denied by some authorities). Its character is soon determined by an attack of profuse hemorrhage, during which there are discharged large quantities of vesicles characterized by their grape-like appearance—in the words of Gooch, “looking like a mass of white currants floating in red-currant juice.” The quantity of these vesicles is sometimes prodigious. In one case the writer emptied the uterus with his hand of a quantity sufficient to fill a large pail.

Treatment.—The treatment is to empty the uterus as soon as possible, and, if the hemorrhage persist, to wash out the uterus with hot water containing sufficient chlorid of iron to give the water a wine color.

PART II. OBSTETRIC OPERATIONS.

CHAPTER I.

ABDOMINAL PALPATION FOR THE DIAGNOSIS OF VARIOUS PRESENTATIONS AND OF VARIOUS CONDITIONS AFFECTING THE PLACENTA AND THE FETUS.

WHENEVER engaged to attend a case of labor the necessity of a thorough investigation some time before labor sets in should be insisted on by the obstetrician. This investigation should consist of a physical examination of the woman, to ascertain her condition and the presentation and position of the child. The consent of the woman will readily be obtained if the reasons for this investigation are presented to her, with the explanation that it is intended to learn her condition and that of the child—to know if the child be living and strong, and if it presents well. In fact, no case of labor should be undertaken without making this preliminary investigation, if possible. This precept will probably be more strictly enjoined in the future.

This investigation, when undertaken near the end of gestation, should be made only by external bimanual palpation, which the woman will not oppose, while many would refuse an internal examination before the beginning of labor. This examination should be undertaken at about the eighth month of pregnancy, or, in the case of a primipara, at the seventh month. Its object at

the eighth month is to correct by external manipulation any unfavorable presentation which may exist. At the seventh month it is undertaken with the view of discovering possible indications for inducing premature labor, such as contracted pelvis or placenta prævia. Such an examination should also be conducted in multiparæ in whom the history shows that in previous pregnancies the children died before the ordinary term of gestation.

Leopold and Spoerrlin make a warm plea for limiting examinations made in the course of ordinary labor to the external parts, and they present the advantages of such a course. Infection is thereby not risked, the natural sense of modesty on the part of the parturient is not offended, and accidental rupture of the membranes is avoided. In the large majority of cases such examination alone is sufficient for the recognition of the presentation and position of the fetus and for the study of the course of an ordinary labor. Abnormalities of parturition may the more readily be detected early, and means of correction promptly employed.

Bimanual external palpation of the abdomen is performed, either at the beginning of labor or some time before, in order to ascertain the existence of pregnancy, the presence of twins, the active movements of the child, and its presentation and position. It is performed especially with the object of correcting by external manipulation the unfavorable presentation and position of the child, thus saving the woman from the dangers of a difficult labor and securing to her and her offspring all the advantages of a normal and physiological parturition. It is especially advantageous at the beginning of labor, when often an internal examination cannot be made because the membranes are too tense and are unruptured,

or because the presenting part of the child is too high, or because the parturient canal is occluded or is very sensitive. There may also be another obstacle to internal investigation—namely, placenta prævia. When this condition is present an external examination by abdominal palpation will convey very satisfactory information as to the presentation and position of the child. This operation will also be of great service in diagnosing a hydrocephalous head when the child presents by its pelvic extremity, and is, indeed, the only method available in the latter instance.

An observer of limited experience, when the conditions are not too unfavorable, is less liable to mistake the fetal presentation by an external examination than by an internal examination alone. The former, says Schroeder, ought never to be omitted, because it gives an excellent means of testing the correctness of the results obtained by the internal examination.

By this obstetric palpation the presence and position of the placenta may also be recognized in many instances, especially when it lies in front. This knowledge is important when the Cesarean or the Porro operation is to be performed. An incision through the placenta, which when it lies in front is exposed to this danger, may thus be avoided and a consequent dangerous hemorrhage be averted. By abdominal palpation the existence of uterine or ovarian or other abdominal tumors may be distinguished from pregnancy. The fetal shock, or, in other words, the active movements, which prove not only the presence but also the life of the child, may likewise be felt in this manner.

Diagnosis of Malpositions by Abdominal Palpation.—To practise palpation successfully it is indispensable

ble to know beforehand what are the principal attitudes, either normal or abnormal, of the child *in utero*, and the laws presiding over fetal accommodation.

What is this accommodation? It is simply the expression of a physical law governing the presentation and position of the child during pregnancy, and also presiding over the mechanism of labor.

The natural accommodation through which, at the end of pregnancy, the vertex presents is the result of the working of a physical law, so well formulated by Pajot, who says: "*Whenever a solid body is contained within another, and the container is endowed with alternations of movement and repose, if the surfaces be smooth and nearly rounded, the contained body will always tend to accommodate its form and dimensions to the capacity of the container. This law presides over the presentations and positions in normal as well as in deformed pelvis.*"

In case of failure of the normal or natural accommodation which causes the head or the pelvic extremity to present first, it is our duty to rectify the failure of nature by well-directed manipulations undertaken before labor begins or during its early stages, while there yet is time to act and before uterine contractions have fully set in. In this way we may substitute a head or a breech presentation for almost any other. After this rectification we should attempt to maintain the child in its new and normal presentation until the termination of labor.

This process is harmless and easy in prudent hands, and has for its object the avoiding of those manual operations "the consequences and ultimate termination of which, once begun, can never be foreseen with certainty," as remarks Dubois. The operation is therefore pre-eminently conservative, and it should be performed

more frequently. It has been resorted to for half a century in Germany, where it originated, and is warmly advocated and much practised in France. To the modern accoucheurs of that country is due the perfection which this operation has lately attained, and which entitles it to be considered one of the greatest obstetric advances of the age.

Obstacles to the Performance of Abdominal Palpation.—There are circumstances under which this operation is difficult or inapplicable.

First, with some women, the spasmodic contraction of the abdominal muscles is so easily excited by the least touch that all judgment is rendered impossible. In this case, if the exploration is urgent, chloroform should be administered.

Secondly, great obesity or thickness of the abdominal parietes renders the exploration nugatory.

Thirdly, a large amount of amniotic fluid, creating great tension of the uterus, or the presence of ascites, makes it impossible to feel any part distinctly.

Fourthly, great tenderness caused by rheumatism, neuralgia, or inflammation of the uterus or of the neighboring organs is another obstacle to palpation. Chloroform in this case also may render the operation possible.

How to Palpate.—The woman must be fasting, her bowels and bladder having been evacuated; she should lie on her back, her head being only slightly elevated, and the arms alongside the body, with the thighs flexed, or, as Pinard prefers, the legs straight and slightly separated, so as to render the region immediately above the horizontal branches of the pubes easier of exploration.

The only dress of the woman should be the chemise, which must be raised as high as the epigastrium, with a

sheet covering her up to the pubic symphysis. In this way her modesty is respected and an examination of the naked abdomen may be conducted decently. No woman will object to this exclusively external examination, while many will resist the internal touch, especially before labor. The patient should be placed in the dorsal position and near the edge of the bed, preferably that edge which is to her left side. The explorer will enjoy greater ease when placed at the left side of and about opposite the patient.

Palpation must be done slowly, gently, without effort, the hands having previously been warmed. It must not be made painful. The accoucheur should not, however, be too timid. Palpation and pressure are less painful when firm than when superficial, hesitating, and prolonged. By diverting the attention of the woman and directing her to take long, deep inspirations, one will, by perseverance, overcome the resistance of the abdominal walls (O. Spiegelberg). It is only when the walls are of an abnormal thickness that the exploration becomes very difficult, and occasionally impossible, without chloroform.

Palpation during labor should be performed only in the intervals between uterine contractions. Palpation is, moreover, much facilitated by a thorough knowledge of the normal and abnormal situations in which the child may be placed in the womb.

Diagnosis of Vertex Presentation.—Knowing that physiologically and in the great majority of cases the head of the child is found at the superior strait or within the excavation, it is there that one must begin to explore. Therefore, seek first the pubis and its horizontal branches—that is, the anterior region of the superior strait; one will thereby get a landmark by which to judge whether

the presenting part be above or within the excavation. This landmark is easily determined in the majority of women; in a few, presenting a great anterior obliquity of the womb or an anteversion, it will be necessary to raise the abdomen with the flat of the hand before exploring.

Next interrogate the excavation by placing both hands on the abdomen about 2 inches to each side of the median line, only the extremities of the fingers touching the anterior arch of the pelvis. Depress the abdominal walls from above downward and before backward, the tips of the fingers still hugging the horizontal branches of the pubis (Pl. 1). If a large, rounded, hard tumor be found at or engaged in the superior strait, it is the head.

If the head be above the superior strait, its mobility can be ascertained by short tapping movements, and a distinct sensation of *ballotement* obtained with one or both hands, the head being the only fetal part which, owing to the articulation of the cervical vertebræ, can furnish this single or double movement of external ballotement. The ballotement will readily be obtained by a sudden pressure being made on the abdominal walls with both hands simultaneously or alternately, and, if a large fetal part be within the region so explored, this sensation will distinctly be felt. The sensation is that of a large body being pushed away by, and again striking against, the tips of the fingers. At other times one hand applied on the abdomen may feel the ballotement and receive the sensation of a communicated shock, the hand remaining motionless. These shocks, which are caused by the active movements of the fetus, are called by Pajot "fetal shocks;" they prove that the child is living, since it moves actively (Charpentier). But these active move-



Examination before labor; examination of lower fetal pole (Dickinson).

ments must be felt by the accoucheur; no explicit reliance should be placed on the woman's assertions, especially if she be preoccupied with the hope or the fear of pregnancy. The active movements are best felt in the morning, just at the time the patient awakes. It seems that the fetus also goes to sleep and awakes with the mother. A prolonged cessation of these movements may indicate the death of the fetus. When the cessation is gradual it has a greater significance. Hydramnios



FIG. 25.—Method of locating the cephalic prominence by arching the hand across the suprapubic region (Dickinson).

and ascites will be impediments to the fetal movements being perceived by abdominal palpation.

If the head be fixed in the pelvic excavation, this

movement of ballottement is no longer possible. Nevertheless, the head is easily recognized through palpation by its shape. It *must necessarily be flexed*, since it is engaged in the inlet. Fassbender taught that frequently under favorable conditions a parchment-like crepitation of the cranial bones may be felt through the abdominal walls, and that the head can thus be distinguished with certainty from the breech. Sometimes, especially with a small fetus, the head feels remarkably small and pointed, so that it may be mistaken for some other fetal part. It is distinguished from any other part, however, by external ballottement, which is never obtained with small parts (Schroeder).

The sensations perceived are described by Pinard as follows: "When the vertex engages, the cephalic tumor

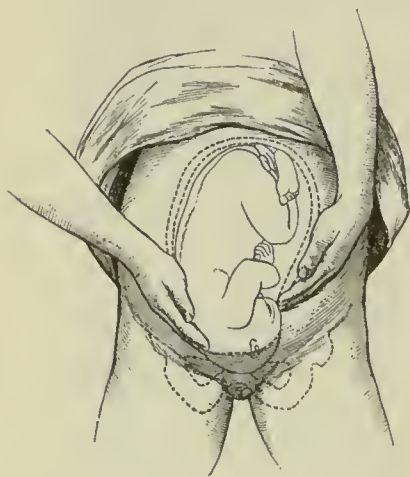


FIG. 26.—Locating cephalic prominence by palpation with both hands. The hand sinks deeper in the pelvis at the side on which the occiput lies (Leopold).

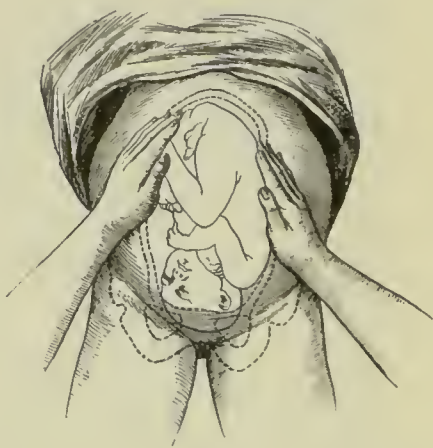
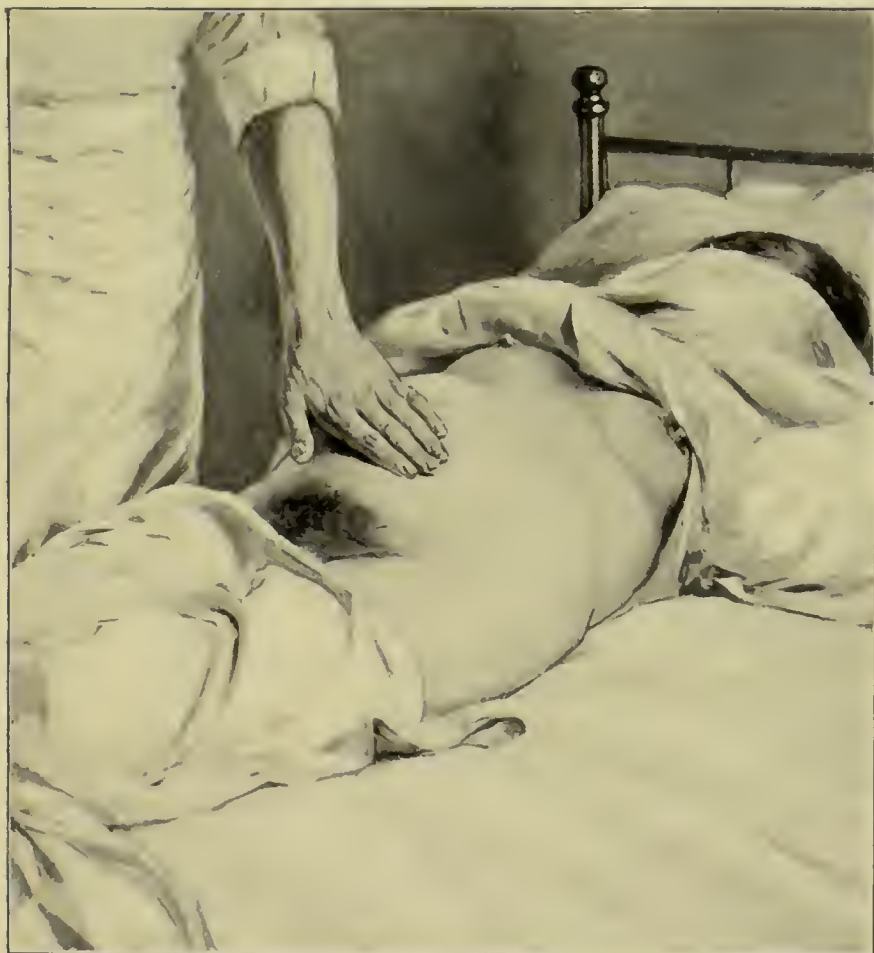


FIG. 27.—Examination of upper fetal pole, showing relation of examining hands to fetal parts (Leopold).

is always more accessible and more protruding on one side than on the other; thus, while the fingers of one



General palpation of abdomen for locating dorsal plane and small parts of fetus
(Dickinson).

hand can descend more or less into the excavation, the fingers of the other hand will be arrested sooner at a point near the superior strait. That portion of the cephalic sphere which is more protruding, higher, and more easily reached is the frontal or facial region of the child" (Fig. 26). This important method of diagnosis is known as "Pinard's sign."

After having ascertained the presence of the head below, the hands should be withdrawn, still open and flat, and palpation made at the upper part of the uterus on its sides and toward the other pole of the child. That other pole must be the breech (Fig. 27), since the head has been ascertained to be below.

Diagnosis of Breech Presentation.—The breech is felt as a voluminous tumor of a tolerably regular shape, and presents various degrees of hardness. By the side of soft parts are found harder ones, which are the tuberosities of the ischia.

The sacral region might be confounded at first with the cranium; therefore some attention is here necessary to ascertain that it is less voluminous and less rounded. Moreover, the breech moves along with the body and is not susceptible of ballottement, so characteristic of the head. Finally, near the breech are frequently found two small rounded and very movable tumors, which are the heels. In the space between the head and the breech the hand feels on one side a very large surface, characterized by its regularity. It is the back, long, slightly convex, and resistant in every direction (Pl. 2).

Dr. Mattei has been able in some exceptional and very favorable instances to recognize the series of eminences formed by the spinous processes of the dorsal vertebræ. The other surface, on the side opposite to that above de-

scribed, is the anterior surface of the body. It is concave or flattened, and is characterized by many movable parts, which are the wrists, the elbows, and the knees.

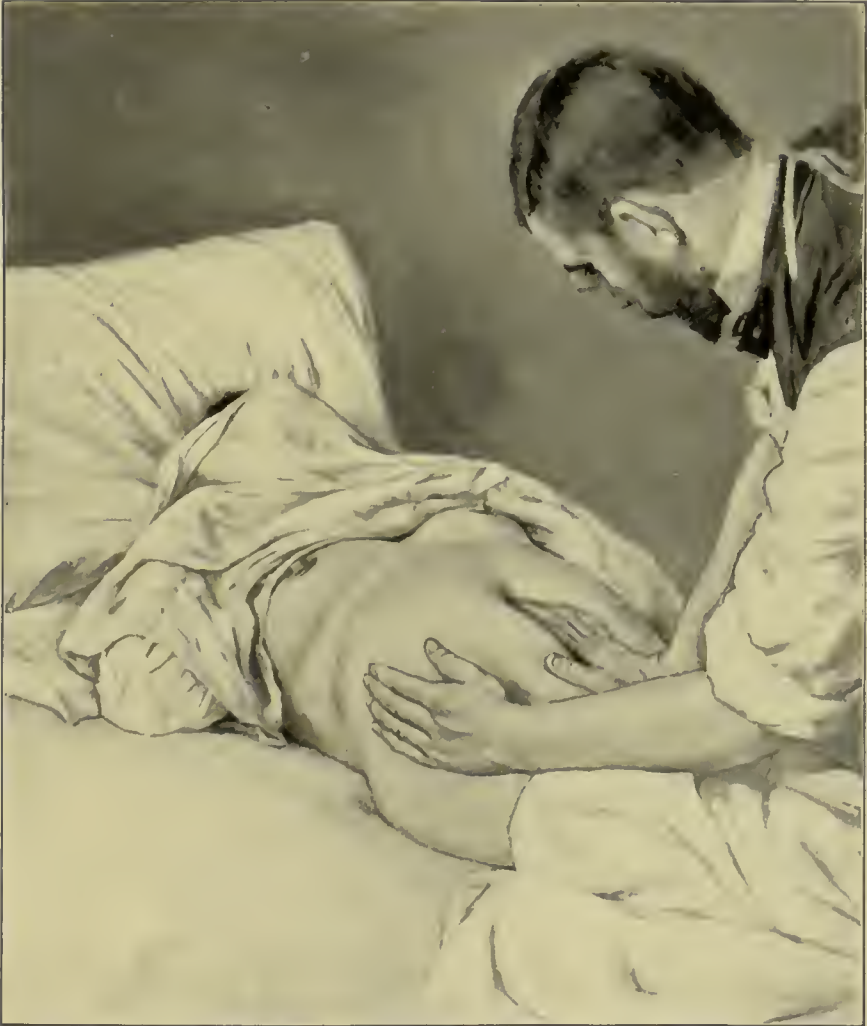
All these points being clearly established, a diagnosis of a single pregnancy can be made out with certainty and the presentation of the child be ascertained.

If, therefore, the head cannot be found at the superior strait nor in one of the iliac fossæ, one must suspect a presentation of the breech, the most frequent of all presentations after that of the vertex. The head, consequently, must then be sought for at the superior part of the uterus. It is not, however, always to be found at the centre of the fundus, for it is often under the false ribs or even under the liver, where it can distinctly be



FIG. 28.—Ballotement.

located. Besides its ordinary characters of smoothness, roundness, and hardness, the head in this case possesses such a degree of mobility that not only can it be moved between the hands, but one or two fingers will be sufficient to displace it, like a ball in a liquid



Depressing abdominal walls in locating dorsal plane of fetus in abdominal examination; displacing child to that part of the uterus toward which its back lies, liquor amnii to the other side (Dickinson).

(Otto Spiegelberg). This is *external cephalic ballotement* (Fig. 28).

The head being above and the breech below, the latter will be recognized as a rounded, more or less voluminous, resistant mass, having near it small, hard, and movable parts, which are the feet. The breech is continuous without interruption with the trunk and back of the fetus; while the head is separated from the trunk and shoulders by the short depression of the neck (Budin). The back of the fetus is felt near one side of the walls of the uterus, while on the other side of the uterus can be felt small protruding parts, which are the limbs, and which are always placed on the anterior plane of the fetus (Pl. 3). Thus a diagnosis of breech presentation will be made with certainty.

Diagnosis of Face Presentation.—Palpation in this presentation is of less diagnostic value, since the internal touch generally enables one to reach directly the fetal parts. It may, however, be rendered difficult or impossible when these are still very high. The difficulty is increased when the membranes are not ruptured, the neck not dilated, and the face not engaged. Under these circumstances palpation will enable one to discover a tumor apparently occupying only one side, or rather one half, of the pelvis, quite large, rounded, and easily accessible on one side, but not felt on the other. The hand, carried toward the fundus of the uterus on the side occupied by the tumor, will find the breech, which may be recognized by the special characters already described. By depressing slowly and deeply the abdominal walls the lateral plane of the child, as well as its back, will be felt continuous with the head. Between the trunk and the head, *if the labor is not ad-*

vanced, may be felt a deep depression into which the fingers sometimes slip easily (Pinard).

In certain cases, according to Budin, one may, on the side opposite the head, feel a projection in the shape of a *horseshoe*, clearly defined and constituted by the inferior maxillary bone and the chin. When the projection is not readily felt at the superior trait, one can easily judge of the direction of the chin from that of the back, which is always to be found in an opposite direction.

Diagnosis of Trunk Presentation.—This diagnosis is very simple by abdominal palpation, while it is very difficult, and sometimes, at the beginning of labor, impossible, by the touch only. Hence the superiority of the former over the latter method of diagnosis. It is evident that in presentation of the trunk the head is almost always found in one of the iliac fossæ, and the breech on the other side in a somewhat elevated position. The breech is sometimes concealed under the false ribs, and occasionally under the liver. The fetus therefore lies obliquely above the superior strait.

Presentation of Right Lateral Plane (right shoulder); Fetus in the Left Cephalo-iliac Position.—*Diagnosis during Pregnancy.*—Pinard remarks, in confirmation of the views of Madame Lachapelle, that “in presentations of the trunk the dorso-anterior positions of the fetus are the rule, and the excavation is found empty.” In the above-described presentation the head of the fetus occupies the left iliac fossa. If the patient be a multipara, ballottement of the head may be obtained. In the right hypochondriac region the breech, with its characteristic features, can easily be detected. The resisting plane of the child extends from the left iliac fossa

in the line of a curve following the region of the false pelvis. Above the iliac crest the line is straight.

In the above presentation the right shoulder may occasionally be felt as a small prominence above the inlet and dipping behind the horizontal branches of the pubes. Above and opposite the resisting plane are felt the fluctuation of the amniotic fluid and the sensation of many small fetal parts.

Diagnosis during Labor.—As soon as the membranes are ruptured, as justly remarked by Prof. Hergott, the fetus, compressed on all sides, and especially at both its extremities, partially rectifies its position. The two extremities of the fetus approach the median line, and palpation affords the following sensations: The iliac fossa is occupied by a voluminous and spherical tumor, while the extremity occupying the fundus of the uterus has neared the median line, and the resisting plane of the fetus has assumed an almost vertical direction, although still situated more to the right than to the left. In other words, the above-described curve of the resisting plane of the fetus exists no longer, and the spherical tumor at the iliac fossa seems to be articulated at a right angle to the body of the fetus.

Presentation of the Left Lateral Plane (left shoulder); Fetus in the Right Cephalo-iliac Position.—*Diagnosis during Pregnancy.*—The excavation is found empty. The head, in the form of a round, regular, and hard tumor, occupies the *right iliac fossa*. Ballottement is possible with a multipara. In the *left hypochondriac region* is found the breech, more or less elevated and sometimes touching the false ribs. The resisting plane of the fetus, its direction, the location of the amniotic fluid, and the small fetal parts are as in the presentation

of the right shoulder above described, reading right for left, or *vice versâ*.

Diagnosis during Labor.—After the rupture of the membranes the same modifications in the direction of the trunk are produced as in the above presentation.

Presentation of the Right Lateral Plane (right shoulder), Fetus in the Right Cephalo-iliac Position, and of the Left Lateral Plane (left shoulder), Fetus in the Left Cephalo-iliac Position.—It is necessary to say only a few words in relation to abdominal palpation in these last two positions during pregnancy, since these positions, as a rule, are produced only during labor, and, the uterus contracting constantly during this period, palpation becomes difficult and sometimes impossible, while the touch can give much better results on account of the dilatation of the cervix and the more marked engagement of the fetal region.

In these last positions, when palpation is practised in the intervals of contraction, only two important facts can be ascertained: the inferior extremity of the fetal ovoid, in the form of a spherical tumor, may be found in one of the iliac fossæ, and the superior extremity, in the form of an irregular and voluminous tumor (the breech), occupies the fundus uteri. The resisting plane can be reached with great difficulty, while the small parts of the fetus are superficial and easily found. True transverse presentations disappear during labor; they become nearly oblique.

The differential diagnosis of each extremity is easily made. All that is necessary is to seek for the characters proper to the head and the breech, and especially to determine which of these two extremities allows of external ballottement, remembering that the latter is pos-

sible only with the head. At the time of labor these transverse presentations are transformed into presentations of either the shoulder or the breech, or even occasionally into presentations of the vertex.¹

Diagnosis of Multiple Pregnancy.—In the case of a double pregnancy, the abdomen being uncovered, one may notice at once an unusual size of the uterus. The irregularity of its form is due to a marked depression directed obliquely on the abdominal surfaces. This depression exists always when the fetuses lie obliquely one above the other, as is generally the case, but does not exist when the fetuses lie one in front of the other. The diagnosis of twin pregnancy is easy in the first instance, but difficult in the second.

By palpation, at any rate, one can ascertain the considerable volume of the uterus and the presence of a localized edema above the pubic region. A permanent tension of the uterus or an edematous infiltration of the abdominal walls, thickening them, renders palpation difficult, but does not render a diagnosis impossible if one proceeds carefully and in a rational manner.

The above-described *permanent* tension of the uterus is an important phenomenon to notice, as it is present only in multiple pregnancy and in dropsy of the amnion.

In dual pregnancy the large fetal tumors are double; for instance, one head is found near the superior strait, and another at the fundus of the womb, one back in an oblique direction and superior, and the other in an oblique direction and inferior. In other cases two breeches and two backs are found, and only one head in one of the iliac fossæ; the other head, lying within the excavation, can be felt by the internal touch alone.

¹ Pinard: *Traité du Palper abdominal*, 1878.

Palpation in multiple pregnancy should be chiefly directed to ascertaining the location of the large extremities or poles of the fetus ; after discovering this the diagnosis is easy. A triple pregnancy may be diagnosed by the same method.

Diagnosis of the Position of the Placenta.—When the placenta is placed in front its situation can be ascertained by abdominal exploration, because the uterine vessels are chiefly developed at the point corresponding with the insertion of the placenta, and also because the uterine muscular fibres are less numerous at this point. Hence during a uterine contraction the part corresponding with the insertion of the placenta remains soft and turgescient, and constitutes a marked protrusion, while all the other parts are hard and incompressible. As a consequence, during uterine contractions palpation at this point reveals nothing of the fetus, and ascertains only a considerable thickening of the tissues, while at other points the hand feels many parts of the fetus, and recognizes that it is separated from the hand only by the abdominal walls and the thickness of the uterine parietes. It is very important to determine the exact situation of the placenta, especially if a Cesarean or a Porro operation become necessary. In this emergency, before making the incision it is necessary to ascertain if the placenta is placed to the right, to the left, or to the front of the uterus, and in the last case to exaggerate the rotation of the uterus, either to the left or to the right, to avoid cutting through the placenta with the knife (Wasseige). The diagnosis of an abnormal insertion of the placenta may also be made by abdominal palpation by the method above described.

Having arrived at the diagnosis of a placenta prævia,

the fetus, may be found to present by the trunk, which is a frequent complication in cases of placenta prævia. It will then be of the utmost advantage for the saving of both the lives involved to bring down the head to the superior strait by external version. This change, in case of a central insertion of the placenta, will enable the accoucheur to rupture the membranes by perforating the centre of the placenta with a metallic catheter while maintaining the head at the superior strait by firm pressure with one hand.

A large, firm tampon placed in the obstetrical canal will at the same time produce counter-pressure sufficient to control the hemorrhage from the placenta, which will be thus compressed on both sides. Time may then be afforded, before complete dilatation, to detach the cervical attachments of the placenta by Barnes's method. Under strong uterine action the placenta will be driven out by the fetal head. In case of partial or marginal insertion of the placenta, also ascertained by palpation, the head can be delivered with the forceps as soon as practicable. In either instance both mother and child will be spared the great risks of a podalic version.

Diagnoses of Hydrocephalous and of Anencephalous Fetus by Abdominal Palpation.—The diagnosis of hydrocephalus is not always easy. Labor is tedious and very painful, and frequently causes a rupture of the uterus. If the head presents, the diagnosis can be made during a contraction by the touch. The finger will encounter the unusually prominent forehead, the thin cranial bones with radiated edges, and, separated from each other by wide interspaces, the broad sutures and the enormously widened fontanelles. But if the pelvis of the hydrocephalous child presents, it is only

by abdominal palpation that a diagnosis can be made (Schroeder). At the upper part of the abdomen a very large, semi-hard, irregular tumor will be felt, giving sometimes a parchment-like sensation to the fingers, while the breech will easily be recognized by its special features at the lower part of the uterus during violent contractions. Occasionally an intra-uterine rupture of the dropsical head takes place; then the head is very indistinctly felt at the upper part of the uterus, while the breech still preserves its size and position.

A hemicephalous or anencephalous monster when presenting by the breech may be recognized on palpation by the absence of the spherical and hard vertex at a point opposite the breech. In these cases the shoulders and the breech are often very well developed, but the round hard head is not found where it should be. The quantity of the liquor amnii, very considerable in this anomaly, renders the diagnosis difficult and often impossible. The same difficulty, but not an impossibility, exists in making a diagnosis by abdominal palpation in some of the other malformations or monstrosities. The method of exclusion should be adopted in these cases of difficult diagnosis; for instance, in *hydro-meningocele*. This is a congenital tumor of the cranium and face, with concomitant profound defects of the brain and cranium, and consists of a diverticulum of the meninges containing brain, with or without serous liquid. *Encephalocoele* (Vrolik) is a variety of the above.

If the fetus presents by its upper extremity, the touch will lead to a diagnosis; if it presents by the breech, this part will easily be defined, and at the upper part of the uterus will be felt by abdominal palpation a double tumor constituted by the head and a semi-hard body joining it

containing the hernia of the brain or encephalocele. The presence of the breech at the superior strait, and no head being felt at the upper extremity of the short and hypertrophied trunk, will lead to a diagnosis of an *acephalous* monster. The diagnosis of acardia can likewise be made by palpation (Poppel). These monsters are generally born by the feet—a fact which renders abdominal palpation so useful in making a diagnosis, while it is impossible to ascertain the nature of the case by the touch; especially is this true of acephalia. These labors are often very difficult on account of the hypertrophied trunk, and they call for active interference on the part of the accoucheur.

CHAPTER II.

EXTERNAL AND COMBINED VERSION.

Introduction.—Among the interesting and difficult operations which may be demanded in labor, and which call forth the best skill of the obstetrician, may be mentioned version by external manipulation, cephalic version, bipolar version and the combined method, podalic version, the use of the forceps, the Cesarean operation, symphyseotomy, and embryotomy. These subjects are treated of at length in their proper places, beginning with version.

Version is an operation which consists in removing from the superior strait that region of the fetus that at first presents, in order to substitute for it another pres-

entation, which will then be one either of the superior or the inferior extremity of the fetus. Version is performed by external manipulation (that is, by bipolar cephalic version, in which the head is brought to the brim of the pelvis), by the combined method (in which both hands co-operate, the one externally and the other with two to four fingers introduced through the os), or by the internal or podalic version (in which the whole hand is introduced into the uterus and the pelvis of the child is brought to the superior strait).

History of Version.—Impressed with the great advantage to mother and child of a cephalic presentation as compared with the other presentations, the earliest observers were naturally led to some method of artificially correcting malpresentations. This idea is found even among primitive peoples by Engelmann, who, in an instructive book on *Labor among Primitive Peoples*, speaks of the Mexicans, among whom massage and expression are combined to force the fetus to present by the head. These procedures among this people are, however, more or less barbarous.

To correct malpositions the Japanese physician manipulates the abdomen of the patient. He practises a lateral massage with the palms of his hands, beginning at the seventh cervical vertebra and stroking the flesh downward and forward, including the nates and hips, repeating this movement from sixty to seventy times. This is done every morning after the fifth month. This procedure is practised when malpositions are discovered or are expected, for certain superstitious reasons. An old practice among the Japanese was the use of a silk belt to compress the uterus of pregnant women. In *labor*, massage and expression are also employed by

them for the correction of malpositions, which are only discovered by the simple fact that the child is not expelled in proper time. More violent means are sometimes resorted to, such as forcible kneading, shaking, tossing in a blanket, or trampling on the abdomen. They believe that there is a possibility by these violent means of thus forcing the child into its proper axis, with breech or head in the pelvis, and of driving it through the natural passages. They either resort to these external manipulations or they leave the mother and child to perish. Hippocrates advised succussion. The Arabian physicians, including Rhazes, recommended the transformation of all presentations into that of the vertex.

Version by External Manipulations.—Roesslein in 1513 and Rueff in 1554 recommended cephalic version by external manipulation even in presentation of the pelvic extremity. At as early a date (1550) Ambroise Paré and his pupil Guillemet gave the preference to podalic version by the internal method, and cephalic version nearly disappeared from French practice, so that Peu (1694) and John Pechey, an English obstetrician (1698), were for a long time the only ones to teach it. Smellie (1750) for a short period, taught cephalic version by external manipulation and later abandoned it. It was, however, again warmly recommended by Osiander (1799) and by Flamant of Strasburg (1803), but it is really to Wiegand (1807) that are due the details of the operation. This eminent obstetrician then presented, for the first time, the principles and technique of the procedure.

From the publication of Wiegand's *Memoir* (1812) version by external manipulation became a standard opera-

tion in Germany, and was practised by Outrepont (1812), Siebold (1821), and since by Buch, Michaelis, Martin, Naegele, Scanzoni, Braun, Spaeth, Hegar, Schroeder, and especially by Esterle and Spiegelberg. In England external version remained ignored until accepted and taught by Barnes, Duncan, and Playfair. In America it was equally neglected until advocated by Barker (1860), Taylor (1864), Chadwick of Boston, and Paul A. Mundé (1879). Notwithstanding the labors of these able advocates, the operation is not yet so thoroughly accepted in America as it should be. In France version by external manœuvres remained a long time in obscurity, although recommended by Flamant of Strasburg (1803) and his pupils. It is more or less indicated in the works of Velpeau, Dubois, Desmoreaux, Jacquemier, and others. Mattei, especially from 1845 to 1855, showed himself a strong advocate of the operation, but it was only within the last few years that Tarnier and his pupils, Chantreuil, Pinard, and Budin, definitely popularized its performance.

External Version: Method of Operating.—Pinard teaches that version by external manœuvres should be performed during gestation at the eighth month, when the head occupies one of the iliac fossæ or the superior segment of the uterus. Pinard says that “before performing the operation it is necessary that the woman be placed in the correct obstetrical position; that is, in the dorsal decubitus, with the lower extremities extended and slightly separated, and the arms lying alongside the body, just as when we intend to palpate. Should uterine contraction occur during the operation, we must cease all pressure and wait for complete relaxation.”

1. *Head in One of the Iliac Fossæ and Breech in the Opposite Flank.*—“In this case apply one hand over the

fetal head, the other over the breech, and by gentle and *sustained* pressure, exerted in opposite directions over one and the other extremity, turn the two poles of the fetus under the median line."

2. *Head in Relation with the Superior Uterine Segment, Breech Below.*—"In view of the great mortality of the children in breech delivery (Hegar, 22 per cent.), the conversion of a breech into a head presentation should be attempted (Fig. 29). Easy with multiparæ, difficult



FIG. 29.—External version; arrows show the direction in which the ends of the fetus should move (Dickinson).

with primiparæ, the operation should be desisted from if no tendency to the evolution of the child be produced" (Pinard).

Pinard's Bandage.—After rectification by external version the ingenious bandage of Pinard (Fig. 30) should be applied and maintained in use to the end of gestation.

This bandage is composed of a posterior portion made of two lateral pieces joined by buckles and straps, in order to tighten or loosen the bandage according to the size of the abdomen. This portion connects with pieces of elastic which extend around the flank on

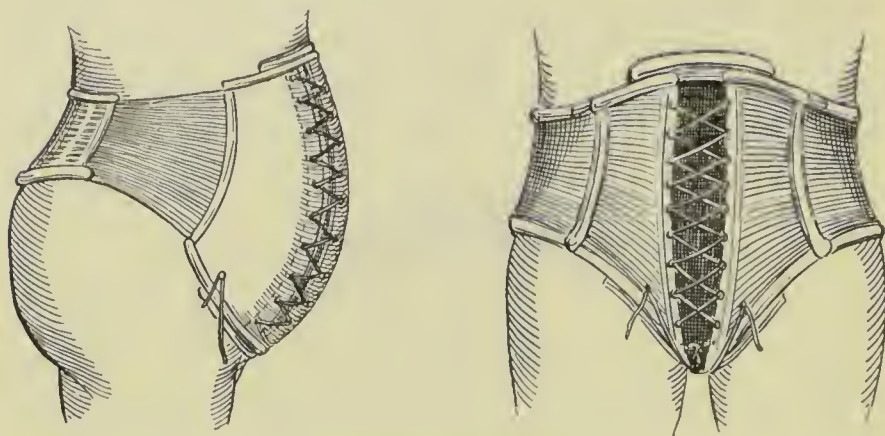


FIG. 30.—Pinard bandage.

each side, where they are attached to two pieces laced together crosswise through eyelets. A flat tongue-like piece is adjusted over the abdominal walls under the lacing before the bandage is permanently fixed in place, both preventing the hard contact of the lacing with the skin and rendering a strong compression supportable. The thigh-straps are put on to prevent the bandage riding up over the abdomen. This completes the bandage.

When and to what cases should the bandage be applied? In a woman eight months pregnant, if the head be not engaged in the pelvis or at the superior strait, the bandage should be applied after rectifying the presentation by external version. It is necessary that the bandage be passed under the flanks of the woman before the external version is performed, for the efforts of the woman in raising herself would suffice to reproduce

the malposition. We should be well assured, before fixing the bandage, that the head is above the excavation. During the first day the compression should be moderate, and should gradually be increased as demanded by the stretching of the rubber, and also on account of the accommodation of the fetus. The bandage should be removed when the os is completely dilated and the membranes ruptured.

Innocent Character of Breech Presentations.—The writer must, however, enter a protest against Pinard's (which is also Mattei's) doctrine that a breech should be converted into a cephalic presentation—first, because in primiparæ it is generally impossible to perform fetal evolution on account of the resistance of the vagina and soft parts; and, secondly, on account of the permanency of the fetal accommodation, which will almost always cause the breech to return to the superior strait, although partially and temporarily displaced from it. In multiparæ, on the other hand, the operation is not required for a breech presentation, which usually, with them, ends favorably to mother and child if properly managed. The danger to the child of a primipara, as is well known, is on account of the delay in the delivery of the head caused by the resistance of the soft parts. Another objection to the conversion of a breech into a cephalic presentation exists when a contraction of the pelvis has been ascertained, especially such as is found in Nægele's "oblique-oval pelvis," in which the narrowing affects one side much more than the other; that is, one in which the sacro-vertebral angle, though projecting strongly forward, is at the same time turned to one side. Pelvic version is here preferable, for it enables us the more easily to direct the back and the

large occipital extremity of the head toward the most roomy side of the pelvis. The accoucheur, then, ought always to endeavor to cause to descend into the strait that extremity of the child which is nearest the opening of the pelvis. When turning by external version for transverse presentation occurring in a case of contracted pelvis, we should, if possible, endeavor to bring the breech to the superior strait rather than the head. The delivery will then be much facilitated, as Simpson so ably sets forth. After procuring a breech presentation the bandage should be applied to keep the child in that presentation until labor sets in. The first great indication for external version is, therefore, a presentation of the trunk, which is to be converted into one of the breech. The second indication is a contraction of the pelvis, in which case it is desirable to bring the breech to the superior strait. A third indication is an abnormal insertion of the placenta, such as coexists so often with a malpresentation of the child.

Among *contraindications to external version* are all circumstances requiring prompt termination of the labor—namely, hemorrhage, convulsions, syncope, rupture of the uterus, prolapsus of the cord, fetal monstrosities, and twin pregnancy.

Methods of Operating during Labor.—*Preliminary Precautions.*—Reascertain by palpation the presentation and position. Empty both bladder and rectum. Quiet irregular spasmodic contractions with opium (Wiegand). Do not evacuate the waters, or do so only in part.

Edward Martin's modification of Wiegand's original operation is as follows: The patient is placed in the dorsal position, the pelvis being slightly raised. The operator, standing near the head or chest of the patient, clasps

the abdomen with both hands. To change the position of the child one hand is applied to the lower part of the abdomen, in order to bring toward the orifice that fetal part which is nearest to it, be it the head or the pelvis. At the same time, the other hand directs toward the superior segment of the uterus that fetal part which is nearest to *it*. These manoeuvres, which are begun in the interval between two pains, must be continued until the contraction has acquired its maximum of intensity. At this moment the uterus and its contents must firmly be held by embracing them from both sides. After a short pause the manipulations are cautiously begun again. The uterus is then seen gradually to assume its normal oval shape. If the operator's hands become fatigued, an assistant or the midwife may take his place.

If the intervals between the pains are very short, the parturient may advantageously be turned to one side for a few moments, selecting that side toward which the inferior extremity of the child, usually its head, is directed. The obtruding part should be supported by a hand or a cushion. After the head is engaged the membranes should be ruptured in order to fix the child in its new position, the labor being terminated as usual. By this operation neither the mother nor the child runs any risk. If not successful, one may still have recourse to Braxton Hicks' combined method or to the classical podalic operation at the proper time.

Bipolar Cephalic Version.—Cephalic version may be performed either by the external method alone, as described above, or by the bipolar combined method, with the simultaneous employment of the hands externally and internally. These are the methods advocated by Wright of Cincinnati, Hohl, and Braxton Hicks, who,

with the fairness of a noble mind, gave Wright the credit of having first advocated the idea. The method chiefly consists of various manipulations with the object of bringing the vertex, when placed in some part of the pelvis not corresponding with the os internum, to the superior strait.

(For further details on these interesting methods the reader is referred to the *American Text-book of Obstetrics*.)

The conditions for the performance of this operation are so seldom met with that it will never become very popular. These conditions are—that the child be movable; that the greater quantity of the liquor amnii have not escaped; that the pelvis be not contracted and the funis not prolapsed; that the os be dilated; and that the uterine contractions be moderate. The escape of the waters makes this operation difficult and frequently impossible. Therefore too much time should not be spent in its performance, and an early podalic version should be resorted to.

Braxton Hicks' Combined Method of Version.—This is one of the greatest advances of modern times in obstetrics. However, it should not be extolled with so much enthusiasm as is indulged in by some English and American writers, because its sphere of usefulness is quite limited.

Technique.—In the words of Braxton Hicks: “In the bipolar method of turning the two hands operate simultaneously upon the extremities of the fetus” (Fig. 31). “The patient should be in the dorsal position, and all preparations should be seen to as in podalic version” (to be described later). “Two or three fingers only are to be gently carried through the os internum. When the presenting part is reached the external hand should be laid upon the abdomen and pressure brought to bear

upon the breech. The two hands should then move the extremities of the child in opposite directions." To quote Dr. Barnes: "This movement is effected by a combina-

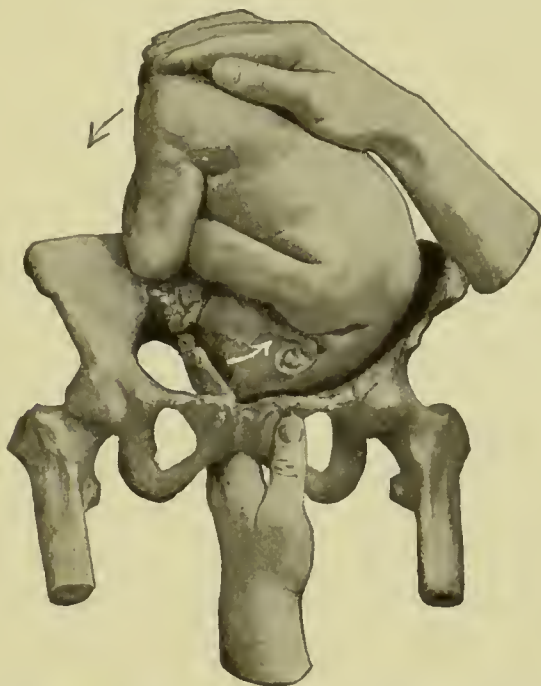


FIG. 31.—First step of bipolar podalic version: two fingers within the cervix lift the head toward the iliac fossa, while the breech is crowded over toward the other ilium (Dickinson).

tion of continuous pressure and gentle impulses or taps with the finger-tips on the shoulder or head, and a series of half-sliding, half-pushing impulses with the palm of the hand outside." When the breech is well pressed down to the os internum, it should be seized and hooked with the fingers of one hand and be drawn down. As the breech is brought into the pelvis by tractions upon the leg, the other hand should be employed to press up the head until the version is completed. These manipulations are to be conducted during the intervals be-

tween the pains. Care should be taken not to hook down the cord along with the knee.

CHAPTER III.

PODALIC VERSION.

Definition.—Podalic version is an operation which consists in bringing the pelvic extremity of the fetus, whatever may have been the previous presentation, to the level of the superior strait. The operation may be resorted to when cephalic version is not possible. For a long time it has been customary to include podalic version and the subsequent extraction of the fetus under the same name. These two operations, however, are quite distinct, for in a transverse presentation, when the feet have been brought to the vulva, one can leave the expulsion of the fetus to nature if there exist no indications for terminating the labor rapidly. As a general rule, nature should be allowed to complete the labor, for the expulsive force of the uterus will, unassisted, maintain the arms crossed over the chest and the head flexed.

Indications.—Podalic version is indicated in transverse presentations, in excessive inclinations of the head, and in face presentations with the chin posterior at the superior strait; in placenta prævia; in certain cases of prolapsus of the funis; in all accidents, such as hemorrhage threatening the life of the mother or that of the child and supervening before the head is deeply engaged; in some cases of eclampsia and of rupture of the uterus; in the

presence of certain tumors ; in certain contracted pelves, especially the oblique-oval variety, the operation permitting the accoucheur to direct the greatest diameter of the fetal part through the largest part of an asymmetric pelvis. In symmetric narrowing with a diameter of more than $3\frac{1}{2}$ inches cephalic version should be done when practicable. With a diameter of from 3 to $3\frac{1}{2}$ inches, the head presenting, podalic version should be performed in order to bring the head down to the superior strait by its smallest diameters—namely, the bimastoid, the bitemporal, and the biparietal—in the order named, thus causing the head to enter the pelvis as an inverted wedge, according to Simpson's method. One of the limitations of podalic version is met with when in shoulder presentation the shortest diameter of the pelvis is below 3 inches ; version being impossible, symphyseotomy or Cesarean section should be performed if the child be living ; if dead, its size should be reduced by craniotomy or by cephalotripsy. No Cesarean section should be done for a dead child.

Conditions for Podalic Version.—Some of these conditions are indispensable, others only favorable. The *indispensable* conditions are—dilatation, or at least a complete *dilatability*, of the neck ; the fetal part must not be too far engaged, and must retain some mobility ; the dimensions of the pelvis must be such as to allow of the passage of the fetus. It should be remarked, however, that in transverse presentations the dilatation of the neck is seldom complete, because the presenting part does not serve as a wedge. It is when the dilatation is complete and while the membranes are not yet ruptured that version should be performed by rupturing the membranes, pushing the hand directly to the

fundus of the uterus, and seizing the feet, which can then be done with the greatest facility, the arm of the accoucheur acting as a stopper or tampon to prevent a too complete evacuation of the water. But, unfortunately, the midwife in attendance will often have prematurely ruptured the membranes while the parts were still high, and will thus have deprived one of the presence of the amniotic fluid, which so facilitates turning. The integrity of the amniotic pouch therefore constitutes one of the *favorable* conditions. Other favorable conditions are the dilatation of the orifice and the *mobility* of the fetus.

Preliminary Precautions.—Determine with exactitude the cause which renders podalic version necessary. Form a clear idea of the diagnosis. If the head presents, ascertain whether it be by the vertex or by the face. In the first case, find the occiput, and in the second, the chin. This will enable you to determine whether the feet point forward or backward. If it be the *trunk* which presents, one must know by which shoulder, and also the direction in which the head is to be found. It is all-important in trunk presentations to understand clearly which side or shoulder presents at the strait, since the accoucheur must always endeavor to turn. When the shoulder presents, the finger first detects the rounded tumor formed by its summit, upon the surface of which a small osseous projection, constituted by the acromion, is distinguished; then the clavicle and the spine of the scapula are felt, the one behind and the other in front, according to the position, and below the clavicle the intercostal spaces are easily made out, while under the spine of the scapula there is only a plain surface, terminated by the acute inferior angle of the bone, which is

movable and permits the finger to slip under it; lastly, on the sides of the tumor formed by the shoulder the axillary space can always be distinguished, and sometimes also (though on the opposite side) the depression of the neck can be felt. The shoulder being once recognized, we must next determine which one it is and what is its position.

Cazeaux recognizes four positions of the trunk—namely, two for the right and two for the left shoulder—and he calls attention to the fact that the relation existing between the location of the head and the direction of the child's posterior plane is different in each of the four positions. Thus, there are two positions in which the head is to the left—namely, the first position of the right shoulder and the first position of the left shoulder; in the latter the child's back is turned toward the mother's loins; in the former, on the contrary, it is in front; therefore whenever the head is to the left and the child's back is behind we have to treat with a first position of the left shoulder.

In the same way, there are two positions in which the head is to the right—namely, the second position of the right shoulder and the second position of the left shoulder; but observe that in the latter the back looks anteriorly, while in the first position of the left shoulder, on the contrary, it is directed posteriorly. Hence to recognize a second position of the left shoulder it will only be necessary to ascertain that the child's head is turned toward the mother's right, and that its back looks anteriorly. In other words, to satisfy ourselves which is the presenting shoulder and what is its position we have only to find out where the head lies and the position of the posterior plane of the child.

The shoulder presenting and being recognized, it becomes evident that if the axillary space looks toward the mother's right the head will be to her left, and *vice versa* ; consequently, the situation of the head is readily known by the direction of this space, and, as regards the child's dorsal plane, the scapula will clearly indicate its position.

When the elbow alone is accessible to the finger, the former may be recognized by the three osseous projections (the olecranon and two condyles) and by the vicinity of the chest and intercostal spaces (intercostal grid-iron). The elbow having been distinguished, it will be necessary, in order to make out the position, to ascertain where the fetal head lies, and where is found the forearm, which is always placed on the anterior plane of the fetus.

It sometimes happens that the hand is found hanging down in the vagina or even appears at the vulva. Now to determine which is the presenting hand in these cases *shake hands* with the child. The right hand of the obstetrician will shake its right hand. This is a simple rule. This hanging out of the hand or arm of the child is rather an advantage, as it facilitates the diagnosis, and is not an obstacle in performing version. In case of doubt the hand may be pulled out of the vulva.

As in every labor, the bladder and the rectum should be emptied. The accoucheur should take off his coat, bare his arms by raising and pinning up his shirt-sleeves, and grease his arm up to the elbow, using lard or cold cream, but no oil. The palms of the hands should not be greased, as they are to seize the child's feet, already slippery enough.

The necessary appliances for the operation consist of

napkins, tapes (about one yard long), a pair of forceps, a laryngeal tube (the Ribemont tube preferred), scissors, ice, warm water, brandy, and stiff chicken-wing feathers, which, moistened, are to be used for removing mucus from the throat of the child. The other usual means of resuscitating the child are to be employed should it be born in a state of apparent death, which is often the case.

The Bed.—Ordinarily, the bed is too low. It should be placed with one side against the wall, and it should be resistant, to keep the woman from sinking in. A sewing-board or the leaf of a table should be placed between the first and the second mattress, to raise the bed high enough to admit of the accoucheur lowering his elbow as much as necessary to enable the hand to reach the fundus of the womb.

Position of the Woman.—The patient should be placed across the bed with her nates at its very edge, her legs flexed and widely apart, and her feet resting on the thighs of two assistants, who are each seated on a chair. The woman should lie on her back, except when the back of the child is to the mother's back, in which case the lateral position is preferable, as the feet of the child are then on its anterior plane and its arms are crossed on its chest, and the hand will more easily pass along the axis of the superior strait. However, when, after evolution, the child's breech is brought down into the excavation, the patient should be placed on her back, and the labor be terminated in this position, which permits one better to express the after-coming head and to secure a firm retraction of the uterus. The genupectoral posture, recommended by some writers in difficult cases, would not be possible, as in these very cases the patient must be fully under the influence of chloroform.

Chloroform should be given to the full surgical extent, as in all difficult obstetric operations. But if the patient be a multipara with a roomy pelvis, the os completely dilated, and the membranes intact, chloroform is not absolutely required.

The choice of the hand is determined by the position of the fetus and the necessity for drawing its feet over its anterior surface. Choose the hand which, placed between pronation and supination, has its palmar surface turned toward the anterior surface of the fetus. Having made the diagnosis, one knows where the feet are, and, knowing this, it is always easy to find them. In general, the accoucheur should select the hand with which he is the most skilful. The diversity of opinion as to the choice of the hand proves its little importance. In easy version the operation can be performed as safely and as rapidly with one hand as with the other. But when the version is difficult, the dynamic action of the hand awakens powerful uterine contractions to the extent of benumbing it, making the fingers lose their strength, and obliging one to withdraw that hand and replace it by the other. During these paralyzing contractions the hand should lie flat on the anterior plane of the fetus, carefully avoiding pressure on its liver, which it might rupture; the knuckles should be effaced as much as possible, as they might cause a rupture of the uterus. The accoucheur's hand should have been made aseptic and his nails carefully pared; the nails should not extend beyond the pulp of the fingers. He should also justify his intervention in deference to the friends of the woman, and explain the operation to her, and make a very guarded prognosis.

Prognosis and Frequency.—Podalic version is one of the most important of obstetric operations, and often

is the only means of saving mother or child. The prognosis in general is not so favorable in podalic version as is that of the application of the forceps, especially as regards the fetus. The prognosis is better if the version can be undertaken at an opportune moment, and before rupture of the membranes, when the parts are well prepared and with a roomy pelvis.

Among the unfavorable conditions are energetic contractions and *tetanoid* spasm of the uterus; the too deep engagement of the presenting part; rigidity of the uterine orifice; a contracted pelvis; and excessive volume of the child. Previous attempts and errors in the diagnosis and treatment also increase the danger, and may even be the cause of a rupture of the uterus and of the vagina. In other words, fractures and lacerations of the fetal limbs are to be feared, and are very often attributable to the operator: but they are not always his fault, as violent contractions of the uterus alone in a deformed pelvis may cause them. Version, even under apparently favorable conditions, is not always free from danger to either party concerned; therefore too favorable a prognosis should not be given in every case.

According to Zweifel, the mortality of the children is 28.3 per cent., and according to Hegar, 35 per cent.; Churchill states that 1 child in 3 and 1 woman in 15 are lost. Therefore the forceps should always be preferred to end the labor whenever one has a chance to choose between the forceps and version. Depaul has said: "With my forceps I am absolutely confident, because I am sure that I can do no harm, whilst I never perform version without a certain apprehension." What makes the prognosis so very grave in version is the extraction of the head.

The Operation.—The above-described preparations having been gone through with, proceed with the operation in the following manner. Two steps are to be observed: First, *the introduction of the hand into the uterus up to the child's feet*; second, *the seizing of the feet and bringing them down after the evolution of the fetus*, whose extraction is another operation which will be described later. Before penetrating into the uterus, steady it with the free hand applied externally on the fundus, pressing it from above downward and from before backward, to secure it from slipping away and to avoid tearing the attachments of the vagina from the uterus. The search and prehension of the feet are thus made easier. It is preferable to do this without the aid of an assistant, because there are thus furnished more precise data as to the position of the feet and the depth to which the hand must penetrate in order to seize them. Arriving at the os, wait for the *interval* after a pain before acting further.

1. *Introduction of the Hand into the Uterus up to the Child's Feet.*—Give to the hand the shape of a cone, as when about to try on a pair of gloves; turn the thumb under the fingers, to make the cone narrower. By a slight movement of rotation one can then penetrate easily. After passing the vulvar ring one comes to the protruding sacro-vertebral angle. The hand, which has been directed from before backward, should now be directed from below upward in search of the orifice. Some slight force is here necessary. Avoid, however, titillating the orifice, in order to guard against contractions which would force one to stop operations.

If the membranes are intact, push the hand gently but rapidly to the bottom of the uterus; in so doing break

the membranes as the hand passes above the os internum. Break them from below; the hand will act as a tampon to prevent a free discharge of the waters. This procedure is better than to rupture the membranes above, as one might thereby detach a portion of the placenta, produce subsequent hemorrhage, and get the hand entangled between the loosened membranes.

2. *Seizing the Feet and Bringing them Down after the Evolution of the Fetus.*—If both feet are found, seize them as firmly as possible; if only one foot, be satisfied with it. This *monopode* version will, in fact, be safer for the child, as the larger size of the breech will better dilate the orifice; if a knee is found, make version with it, as taught by Barnes and Simpson.

If we draw on one foot, as soon as the breech is delivered the second foot will free itself. It is only when the second limb has become straightened on the abdomen of the child that efforts should be made to bring it down by introducing one finger in the fold of the groin, in order to free the thigh. Direct tractions on the thigh or the leg should not be attempted, because they would probably cause a fracture.

First Stage: The Search for the Feet.—Several methods have been advocated to reach the feet, but they are no improvement on the classical plan, which is the longest to perform, but is the most certain. The hand being introduced, search first for the lateral plane of the child or even for its posterior plane (Fig. 32). The hand, following this plane to its full extent, will feel the nates; then, descending to the thighs, it will come to the legs, and arrive with certainty at the feet, which can easily be seized.

If not successful at first, make attempts in some other direction, groping along, as it were, so as to come to one

foot, a knee, or even the fold of one groin, which last is to be depressed, with the view of bringing down a thigh. This is Charpentier's method, but it supposes

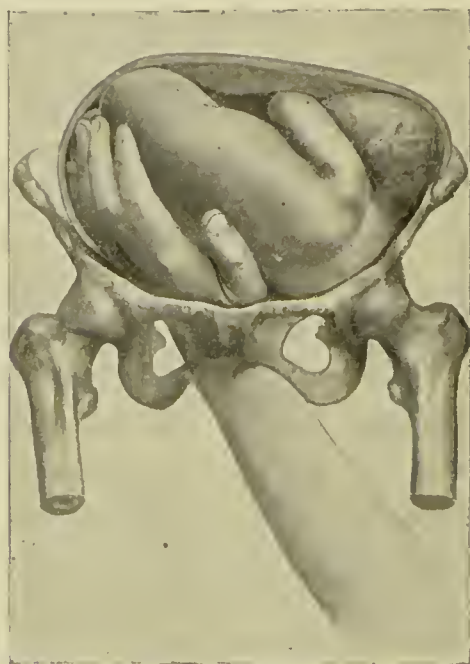


FIG. 32.—Method of reaching the foot by first passing the hand around the breech (Dickinson).

the child's back to be in front. It is excellent technique, except, as remarked before, that if the child's back be to the back of the mother, the woman should be placed on her side, and the hand, being introduced on the anterior plane of the child according to the axis of the superior strait, will easily reach the feet, which are to be found on its anterior surface (Fig. 33). When the breech appears the woman should be placed again on her back until the completion of the labor.

Second Stage: The Evolution of the Child.—In this stage act slowly, and draw the feet from above downward and from before backward, following the posterior

wall of the uterus. Take the anterior foot, as it facilitates evolution. Draw during the intervals of *contraction*, taking care to double up the child on its anterior surface, as it facilitates flexion. The external hand as-

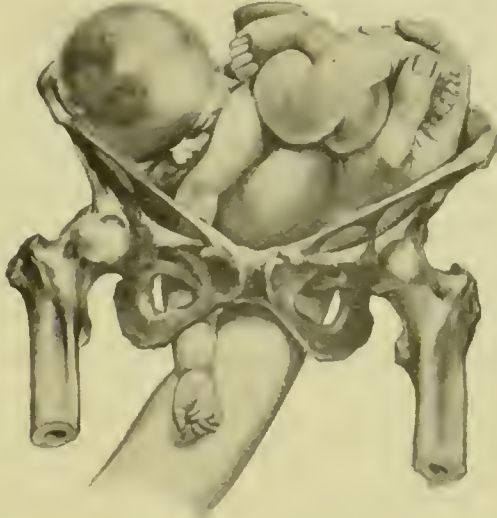


FIG. 33 —Passing the hand along the side-wall of the uterus to seize the feet (Dickinson).

sists the evolution by guiding the head toward the fundus of the uterus. By these procedures the head of the child will be kept flexed and its arms remain crossed on the chest.

If there are contractions during this stage and the hand be closed, flatten the hand on the child during a pain, to avoid rupturing the uterus with the knuckles. Guard against pressing strongly on the abdomen of the child, as a strong pressure might be fatal by rupturing the liver, which is always proportionately very large in the child in the uterus. The second stage is ended when the pelvic extremity is at the orifice and the feet are at the vulva.

Complications and Obstacles in the Performance

of Version.—*Edema of the Vulva*.—This complication is to be corrected by multiple incisions.

Rigidity of the Cervix.—The cervix sometimes remains closed for a long time, notwithstanding very painful contractions. The *treatment* is to put the woman in a warm bath for some time. The womb will then often relax rapidly, and the child may be born spontaneously and be drowned in the bath if it is not watched for. This expulsion will occur if the child is small or is dead. The womb may relax in the woman's agony or may rupture spontaneously. The child will then suddenly become mobile. The accoucheur may unjustly be blamed for this accident happening before he has attempted version.

In case of spastic rigidity of the cervix no version should be undertaken before sufficient dilatation or dilatability, if one wishes to avoid laceration of the cervix or of the uterus. If a prompt interference is indicated, chloroform the patient and dilate manually or with Barnes' bags—a somewhat dangerous procedure, but sometimes absolutely required.

Vicious Insertion of the Placenta on the Neck.—In this complication tampon the vagina to check hemorrhage, and when dilatation is complete turn by passing the hand by the side of the placenta.

The Shoulder deeply Impacted in the Maternal Parts.—In this case try the postural method; if not successful and the child be living, perform Cesarean section. If the child be dead, which is usually the case, perform embryotomy.

Violent retraction of the uterus on the child, which the uterus fits like a glove. In this case chloroform the patient to the full surgical narcosis, and turn. If not

successful, bleed *ad deliquium animæ*. This was Dewees' practice, and it is the best antispasmodic known.

Extreme mobility of the uterus should be corrected by steadying it. The search for the feet is sometimes rendered difficult, because they are too high. Here have recourse to Deutsche's method, which consists in imparting to the fetus with the introduced hand a movement of rotation around its longitudinal axis; then seize the feet, now made accessible, and draw them down. This procedure is assisted by the free hand exercising external pressure in the direction of the movement produced by the introduced hand.

The evolution of the fetus is at times rendered difficult in cases of twins by the confusion caused in seizing one foot of each child. In doubtful cases take only one foot. It is safe to put a tape around the foot when out, in order to assist in making traction on it. In this traction more strength can be used than one would suppose. It takes a force of sixty pounds to separate the diaphyses from the epiphyses in a child.

A Hand in the Vagina.—Tie a tape around the fetal hand, not to make traction on it, but in order to secure it alongside the body of the fetus and to keep it from being thrown up above its head. A blue coloration of the arm shows that the child is living, because there is still circulation in it. A pale cold arm is a sign of death.

Prolapsus of the Funis.—While turning carry the cord back into the uterus, protect it, frequently interrogate the funis, and hasten the operation for the sake of the child, especially when the pulsations become slow and irregular. Do not decide at once that the child is dead; wait at least twenty minutes after the cessation of all pulsations in the cord before coming to that decision.

Fibrous tumors and other neoplasms at the orifice may interfere with its dilatation, which will be very slow when the tumors are of small size; if very large, the dilatation is impossible. Then the tumors should be removed by the usual surgical means.

Carcinoma of the Neck.—In case this tumor forms a complete obstacle to the dilatation of the neck, the Cæsa-rean section should be performed for the sake of the child, which one must always try to save. If the occlusion be not so complete, free incisions should be practised around and through the tumor. It is, however, a dangerous proceeding.

CHAPTER IV.

EXTRACTION OF THE CHILD.

THE operation of extracting the child was formerly described as the third step in podalic version. But unless some complication arises and becomes dangerous to the mother or to the child, necessitating a prompt termination of the labor, the expulsion of the child should be left to nature whenever a foot or both feet or the breech presents, either naturally or after the performance of version.

Technique.—The precautions are those observed in performing version. The drawing down of the feet should be done *during* a contraction, to guard against the raising of the arms above the head and the extension of the face, because the uterine contractions will maintain the fetal parts in the normal position. The

drawing should be done in the direction of the superior strait to secure the engaging of the hip that is in front. The limbs of the child should be surrounded with a warm cloth to avoid premature respiration of the child from the reflex action of cold.

When the thighs have descended they should be seized as high as possible and brought down very slowly, so as to avoid fractures, which are very easily produced unless the extraction be done carefully.

During tractions the child's back should be directed to the front, in order to secure an occipito-anterior position, which is the most favorable for the disengagement of the head. The tractions should be continued until the hips have reached the inferior strait. The posterior hip is freed by raising it, and the anterior hip by lowering it.

As soon as the hips are freed, look after the umbilicus: the cord may be too short and too tense, which might cause it to be torn off or might produce a separation of the placenta. If it be placed between the legs of the child, the posterior leg should be freed and slipped through a loop of the cord, which should be placed behind to avoid compression. If this procedure does not succeed, the cord should be cut between two ligatures and the labor terminated as rapidly as possible.

The following method of completing the delivery of the child is the one adopted by the school of Nancy, and, if judged from the results obtained, is far superior to any other. In 50 cases of pelvic presentations reported by Dr. Georges Étienne, 50 of the children were born living, while the results obtained by Hegar were 30 per cent. of the children lost, and in the experience of F. Dubois 11 per cent. were born dead. Churchill and

the English accoucheurs show a much worse record, $33\frac{1}{3}$ per cent. of the children being lost.

The Nancy method is as follows: The inferior extremity of the trunk having reached the vulva, as soon as the umbilicus appears the accoucheur firmly seizes the legs of the child, lowers them, and draws with force. But during this time—and *this is the essential point*—a competent assistant, standing at the head of the bed, compresses very strongly and *continuously* the fundus of the uterus through the abdominal walls, thus keeping the head flexed and preventing the arms from rising. Then, leaving the legs, the operator embraces fully the child's pelvis, his hands being applied to both sides of the iliacs, care being taken not to press strongly the soft parts of the child, as this might rupture the liver, which in the fetus descends to the iliac fossa. The operator, still making vigorous tractions, moves the trunk to the right and to the left, gradually liberating it, first on one side and then on the other. A little later he seizes the thorax, the thumbs being on each side and behind on the scapulæ. When the shoulders are freed external rotation must be produced. Then comes the *critical moment*, which is the extraction of the head. But it will have been seen that the head, compressed from above downward, has remained flexed; now, as soon as possible, two fingers of the left hand are introduced into the child's mouth, and at the same time the index and middle fingers of the right hand are made to straddle the neck of the child; the head is rapidly extracted by downward tractions, flexion being maintained by means of the fingers in the mouth. This extraction, it will be seen, is made according to Mauriceau's method, and is quite an improvement on the Prague method (Fig.

34), which is objectionable on account of the grave accidents to which it exposes the child, such as stretching of the spinal cord, luxations, fractures of the vertebræ, etc. (as reported by Ruge).

The essential point, as said above, is the very energetic compression upon the fundus of the uterus to maintain



FIG. 34.—Delivery of the after-coming head by combined traction on the head and shoulders (Dickinson).

flexion. The method is a modification of that of Wie-gand. Without this compression strong tractions would be very dangerous, as they would inevitably cause an extension of the head.

This method is, however, inapplicable in twin pregnancy when the first child presents by the breech; but it

must be remarked that the second child produces, in part, the same effect in compressing the head from above downward. When there is great difficulty in delivering the after-coming head the forceps should rapidly be ap-

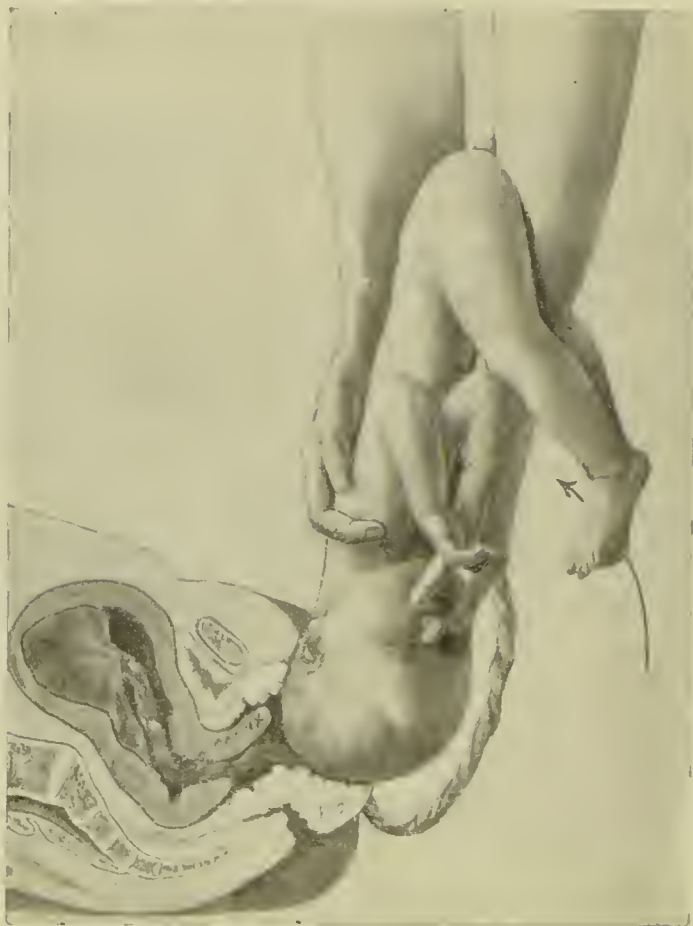


FIG. 35.—Position of the child immediately after the escape of the after-coming head from the vulva (Dickinson).

plied. Such was the practice of Meigs, who in all breech or foot presentations had his forceps within reach, and by quick action saved many lives.

Liberating the Arms.—The anterior arm of the child may be caught between its head and the anterior part

of the mother's pelvis. In this case rotate until the anterior shoulder is made posterior, as taught by Budin. Disengage the head immediately after (Fig. 36).



FIG. 36.—Liberating an arm. To enable the elbow to pass over the promontory, the face must be moved out of the way. The left hand of the operator therefore rotates the head to free the elbow (Dickinson).

The arm may be found behind the neck, between the head and the pubis. It is generally the anterior arm which takes this position, either in leaving the side of the head to slip behind and below it, or by gliding behind the back as the child descends. In the first instance the inferior angles of the scapulæ are far apart; in the second case they are close to the spinal column. To correct this displacement cause the arms to go back over the route they followed in becoming displaced. This manœuvre is assisted by pushing up the child a little and giving it a movement of rotation.

Defective Positions.—The head may extend and both extremities of the mento-occipital diameter may

be found at the superior strait, the occiput being in front. In this case the head must be raised by the hand, flexed, and extracted by two fingers in the child's mouth.

The head extended above the superior strait, the chin being caught above the pubis. In this case the trunk should firmly be raised; then the occiput, the forehead, and the face will successively appear at the inferior edge of the vulva. This is, in fact, a posterior extension of the head as practised by Michaelis, the child's chin in the mean time remaining fixed and pivoting behind the pubis. This is a very ingenious manner of solving the difficulty.

In difficult occipito-posterior positions Madame Lachapelle's method should be tried. The hand is introduced into the concavity of the sacrum. If the occiput is turned a little to the right, select the right hand, or if a little to the left, the left hand; the fingers are then slid as far as the child's face, the operator's hand being strongly flexed on the wrist, its palmar surface in front: the hand quickly assumes pronation, drawing the face backward. The disengagement of the head is finally accomplished by two fingers in the mouth of the child.

In all these defective situations of the head, however, the forceps will accomplish with security the objects of the above measures.

Retraction of the Uterine Neck on the Neck of the Child.—This retraction may have very serious consequences for the mother or for the child. This retraction will take place if the extraction has been undertaken before complete dilatation of the orifice. In these conditions the child may rapidly die of asphyxia or the cervix may be lacerated. Multiple incisions should then be made on the (uterine) neck.

Resistance of the External Soft Parts.—A resisting vulva or perineum may also prevent the disengagement of the head. When these parts are very tense they become of a shining white. If the accoucheur waits or acts too slowly, the child will die asphyxiated by the compression of the cord. The vulva or the perineum should then be enlarged by the performance of *episiotomy* with the bistoury, cutting at the inferior angle of the vulva in an *oblique* direction, to the extent of half an inch on each side, through the transversus perinei muscles. These incisions will rapidly contract, furnishing no entrance to septic agents.

CHAPTER V.

THE FORCEPS.

WHEN the expulsive forces of the woman are insufficient to terminate her labor safely, a *vis-à-fronte* supplements the deficiency of the *vis-à-tergo* by the exercising of traction and pressure on the child's head. The instruments used for this purpose are the forceps, the lever, and the fillet.

Description of the Forceps.—The forceps is a pair of long tongs or, as it were, steel hands, in whose grasp the child's head is held and drawn out from the womb with safety to itself and to the mother. The two branches of these tongs are separable, and each is composed of three parts: (1) The blade; (2) the shank;

and (3) the handle. The blades are fenestrated to make the instrument lighter and capable of embracing the parietal protuberances. The blades must have an interior concavity in order to hold the child's head without compressing it. This concavity is called the "cephalic curve." To reach above the superior strait each blade, besides being long enough, presents a lateral curve called the "pelvic curve." The branches of the forceps are designated as the right and the left blade. The right or the mortise blade is always to be held in the right hand, and is *always* to be applied to the right side of the pelvis; and the left or pivot blade is to be held in the left hand, and is *always* to be applied to the left side of the pelvis. The forceps should be made of choice steel nickel-plated, and heavy enough to be resistant, without too much spring. Its articulation varies according to the different models.

History of the Instrument.—The reader is referred to text-books for the history of this valuable instrument. It suffices to say here that its invention is due to a Frenchman exiled to England, P. Chamberlen, who began to use it in 1647, and who, with shameful cupidity, kept this instrument a secret in his family for half a century, and made its use a financial and exclusive success. His secret, however, was gradually divulged. Improvements soon followed, among which was the modern *pelvic* curve, due to the ingenuity of the Frenchman Levret (in 1747) and of the Englishman Smellie (in 1752) almost simultaneously. The pelvic curve is a great improvement, as it enables the accoucheur safely to deliver the head from the superior strait.

Mode of Action of the Forceps.—This instrument is essentially destined to make *traction*, and the less it

compresses the child's head the better will the latter accommodate itself to the dimensions of the pelvis. An *ideal forceps*, says Schroeder, would be one which, while exercising the least compression on the head, would hold it with sufficient firmness. As an instrument of *compression* it gives but indifferent results, as proved by the conclusive experiments of Baudelocque and others. The reduction amounts only to a few lines, and, being generally produced on the longest diameter of the head, enlarges its shortest diameter, which is the one occupying the shortest diameter of the pelvis. The reduction is therefore useless, and may become dangerous. The forceps acts also as a *lever* in certain operations to be described later.

Dynamic Action of the Forceps.—The introduction of the hand guiding the forceps occasionally determines intense uterine contractions through reflex action. This oxytocic force is not desirable, because it renders the introduction of the forceps at times very difficult.

Dangers of the Instrument.—The forceps in the hands of an accoucheur who is well informed as to the mechanism of labor in the different presentations is not only inoffensive, but is the greatest boon to both mother and child. But in the unskilful or rash hands of one not acquainted with classical rules as a guide it may be the cause of serious injury. Injuries threatening the mother are—lacerations of the uterus, of the vagina, or of the perineum; perforation of the culs-de-sac; injuries to the bladder; fractures of the pelvic bones, etc.; and the production of hemorrhage by emptying the uterus too rapidly.

The dangers menacing the child are contusions and wounds of the soft parts or fractures of the bones of

the head, with depressions, and subsequent idiocy. These depressions should be raised if they produce convulsions or paralysis of extremities. Facial paralyses are very frequent in the new-born, but they generally disappear in a few days, during which the child's conjunctiva and the globe of the eye should be kept moist with the blandest mucilages, such as that of marshmallow or of sassafras. The eye becomes very dry, as the child cannot close it for several days, the paralysis of the seventh pair being often complicated with that of the motor *oculorum communis*.

The forceps may cause hemorrhage into and induration of the cellular tissues of the scalp, which during the operation have been subjected to the greatest compression.

Advantages of the Forceps.—With this instrument, admirable in its simplicity and easy management, the fetal head can be seized and extracted rapidly and safely, thus saving the mother hours of intense suffering. The old French writers called the forceps *tire tête* (head-puller), a very appropriate name, and the Germans call it *Gebersange*, also a very graphic appellation.

OBSTETRIC OPERATIONS.

Obstetrician's Bag.—As a preparation for any obstetric operation or any labor case the obstetrician should carry a bag containing a complete pocket surgical case, and also the following instruments: A pair of forceps, the longer the better; embryotomy instruments, such as Smellie's scissors and a guarded tractor; a cranioclast; Dubois' strong decapitating scissors; Braun's decolator; Pajot's and Braun's decapitators; a bistoury; a pair of straight scissors; a pair of curved scissors; two

English catheters, No. 12; a hypodermic syringe; a Davidson syringe; a half-dozen curved needles; a half-dozen straight needles (for immediate repair of the perineum); a needle-holder; silver and silk ligatures; sterilized gauze; feathers from a chicken's wing. *Drugs* should always be carried in hermetically-sealed bottles: chloroform, 6 ounces; aqua ammonia, 1 ounce; fluid extract of ergot, 1 ounce; whisky, 6 ounces; sulphate of morphia; hypodermatic tablets, $\frac{1}{8}$ of a grain; bichlorid-of-mercury tablets (formula on the bottle); solution of chloral hydrate, 1 drachm to the ounce; laudanum, 1 ounce.

So long as the phenomena of labor are normal and no accident threatens the life of the mother or that of the child, the duty of the obstetrician is patience, and he must know how to wait. Interfere when there is a special indication, never otherwise. But as soon as the indication is present, act without temporizing, for a mode of action which is to save two lives, and which may easily be carried out if undertaken at once, may in a few hours become inefficient, dangerous, or impossible. Timid midwifery is as much to be condemned as "meddlesome" midwifery. In all obstetric operations perseverance, slowness, groping even, while acting, must always precede the use of force.

When midwifery ceases to be expectant and becomes aggressive, action should be firm and intelligent, but never violent. Avoid fuss and haste; never hurry, especially if there be only a little time left in which to operate.

Before proceeding to perform an obstetric operation remove all sources of error. Verify your diagnosis of the presentation, of the position of the child, and of the

condition of the mother's pelvis and soft parts, for mistakes may have disastrous consequences.

If in attempting to ascertain the presentation the usual methods of exploration fail, chloroform the patient to the surgical extent and use the whole hand in the vagina ; for an exact knowledge of the presentation is absolutely required before acting. In thus exploring remember the possibility of rupturing the vagina if it be narrow, and proceed very slowly and gently, but firmly.

Every obstetric operation is a heroic measure, its success depending upon the favorableness of the moment when it is undertaken, as well as upon the method selected and the skill of the operator.

Anesthesia in Labor.—In all operations that will probably be prolonged, difficult, or painful, give chloroform to the full surgical extent. In these cases the operator's entire attention is required, and therefore the chloroform must be administered by a reliable medical assistant. In short and light cases an intelligent nurse will be sufficient. However, she should be watched as well as the patient.

The Anesthetic.—This should be chloroform, preceded and reinforced by a hypodermatic injection of half a grain of morphia. Chloroform is safer than ether, its influence will last longer, and there will be obtained a state of analgesia as well as of anesthesia—a very desirable condition, tending to relax a rigid os, the perineum, or a retraction of the uterus such as might interfere with the performance of version. Ether must be given in greater amount and often causes vomiting. Remove false teeth before giving chloroform, as the patient might swallow them.

Infinitesimal or Placebo Anesthesia.—When it is desir-

able to quiet a very nervous patient or to occupy her attention chloroform may be given in placebo doses. It will please the fancy of the patient and make her believe that something is being done for her.

Consultations.—In all bloody operations, such as laparotomy, Cesarean section, etc., always call in consulta-



FIG. 37.—Method of giving chloroform with the towel inhaler: the illustration represents the towel as transparent (Dickinson).

tion one or two able colleagues for the patient's sake and for personal protection.

Precautions.—Before proceeding to an operation wash the hands in warm water and soap or in a weak solution of corrosive sublimate, biniodid of mercury, or other antiseptic. Keep the *nails well pared*. A sharp nail may,

in turning, rupture the uterus or may wound the vagina and cervix when one is using the forceps. Avoid abrasions at the end of the fingers for the sake of your own safety. If there be any abrasions, cauterize them; a cauterized wound does not absorb. Before operating have at hand the instruments, hot and cold water, vinegar, perchlorid of iron, etc., and the means of resuscitating the child if born in a state of apparent death.

Obstetric Position in Operations.—Choose the *dorsal position*, as a rule, as it allows of uterine massage and of the expression of the child and placenta; it also prevents the entrance of air into the uterine sinuses—a cause of sudden death; it permits the introduction of the hand or the forceps in the direction of the superior strait. If the child's head be high or if version or the forceps be required, draw the patient to the very edge of the bed, her knees being kept widely apart by two assistants, her feet being on two chairs, and the operator seated on a chair opposite to her. If the child's head is at the inferior strait, place the patient on her back, but not so near the edge of the bed. This position enables one to deliver the shoulders more readily should they be large.

In turning, if the back of the child is to the back of the mother, the lateral position is preferable: as has already been explained.

In precipitate labor with an excess of uterine pains, the patient, not being able to assist herself so well, should be placed on her side, as this position will moderate the uterine contractions. But as soon as the presenting part has reached the floor of the pelvis or is distending the perineum, replace the patient upon her back. This position will allow of pressure on the uterus, in order to prevent post-partum hemorrhage and to facil-

itate the expression of the placenta; this position will also permit an easier application of the forceps if an indication present for its use.

Application of the Forceps.—The forceps, the great prime-mover in obstetrics, is the mother's instrument as well as the child's; when properly applied and with a correct knowledge of the mechanism of parturition, it can never do harm. It saves an incalculable number of children from certain death.

The forceps has unjustly been accused of causing lacerations of the cervix. That is not possible, as one of the necessary conditions for its application is a cervix completely dilated or very dilatable. Laceration of the cervix takes place when, before sufficient dilatation, the woman is encouraged to bear down prematurely, or when, after improper administration of ergot, the womb has become *tetanized*.

Fistulæ are caused by too long a delay of the head in the excavation—not by the forceps, but from its non-use (Emmet's statistics).

The correct use of the forceps is the best protector of the perineum, which it generally saves from rupturing.

Indications.—The forceps should be applied in powerless labors when the *vis-a-tergo* fails; in minor pelvic deformity at the inlet or outlet or in the excavation; when the proper diameters of the head and of the pelvis are opposed; in *occipito-posterior* or *face* presentations; on the *breech* when impacted or after turning in *head-last* cases; in *absence of rotation* and *shortness of the cord*. The forceps is also indicated in certain complex labors requiring speedy delivery to save the mother and child, as in *hemorrhage*, *ruptured uterus*, *convulsions*, *syncope*, *exhaustion*, *marginal placenta prævia*, *funis presentation*,

hand or foot with head presentations, rigidity of the soft parts, severe cramps, retention of urine when catheterization is impossible, ventral hernia, and pulmonary emphysema. It is oftener required for primiparæ than for multiparæ.

Before applying this instrument rehearse in your mind the various diameters of the pelvis and head and the positions of the latter.

When called to a case of midwifery *always* take the forceps with you. The instrument may be needed at any time, and if it has to be sent for, the mother and child may perish before the messenger has time to put on his boots.

In difficult cases, the longer the forceps the better. In ordinary cases, with the head at the inferior strait, any forceps may be used; when the head is near the vulva, it can be delivered with a pair of coal-tongs if there is noth-

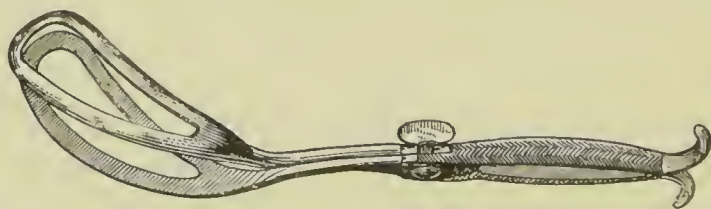


FIG. 38.—Boisliniere forceps: total length, 17 inches; length of fenestra, 5 inches; greatest width of fenestra, $1\frac{1}{2}$ inches; narrowest, $\frac{1}{2}$ inch; width of cephalic curve, $2\frac{1}{4}$ inches; weight, 19 ounces; permanent lock.

ing else and the case requires speedy delivery. For general use the long Pajot, the Hodge, or the writer's¹ forceps

¹ In the forceps designed by the writer (Fig. 38) it is sought to combine the merits of the Hodge, the Pajot, and other instruments, and at the same time to correct their deficiencies. The points in its favor are—first, it is a long forceps with a marked pelvic curve, thus facilitating its application at or above the superior strait; second, it has a marked cephalic curve, doing away with the danger of over-compression of the head, and affording a surer purchase, which is further secured by a slight roughening of the

can be strongly recommended, on account of their sufficient pelvic and perineal curves and the width and shape of their fenestra.

When using the forceps and making traction a finger should be placed just in front of the union of the two branches, to prevent too great compression; a towel folded as a cravat and tied between the upper part of the handles, near the lock, will answer the same purpose.

In difficult cases *Tarnier's axis-traction* forceps gives excellent results, especially when the head is engaged in the superior strait. The Elston forceps acts on the same principle. The Wallace or the Bethel-Davis forceps, on account of the great pelvic curve of this instrument, will also succeed very well in bringing the head down into the excavation; after this it as well as the earlier Tarnier forceps must be used with extreme care, as its great pelvic curve is apt to lacerate the perineum. It would be safer to lay aside these forceps, and continue the operation with Hodge's, Elliot's, Simpson's, Neal's, or any other ordinary forceps with a lesser pelvic curve. This objection does not, however, apply to Tarnier's (Fig. 39) or Lusk's latest model (Fig. 40), which has a lesser pelvic curve than the first needle-forceps. If the operation is difficult, surround the handles of the forceps with a towel to preserve a better hold.

Should the operation be explained and the forceps be shown to the woman? Yes, if she is sensible and cour-

inner surface of the blades; third, the absence of a "knee" at the junction of the blade and shaft, thus removing a serious threat to the integrity of the perineum; fourth, it has a permanent lock, with no key to get lost or to fall off at a critical moment; fifth, the roughness of the handles permits a secure grasp.

ageous. No, if she is timid and nervous. Try to coax her; if this fails, chloroform her before she sees the instrument, and proceed with its application.

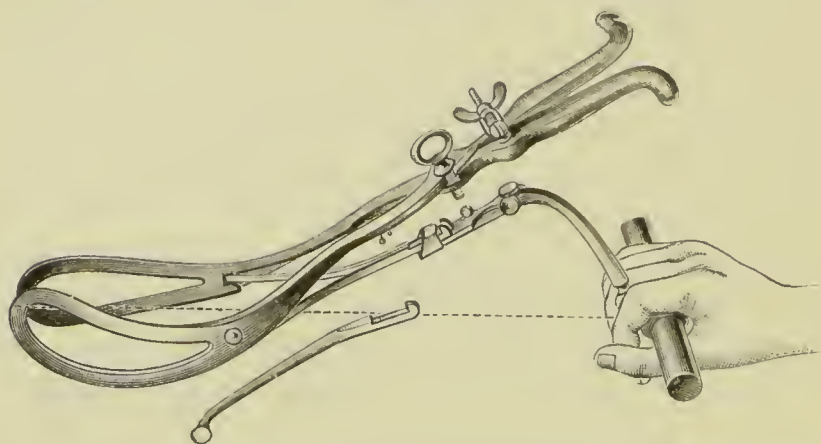


FIG. 39.—Axis-traction forceps of Tarnier (to show the details the hand is represented in an improper position for traction; below is one of the traction-rods).

Preliminary Precautions.—In all obstetric operations empty the bowels and bladder. Chloroform the patient if the operation is to be difficult or the patient be unruly.

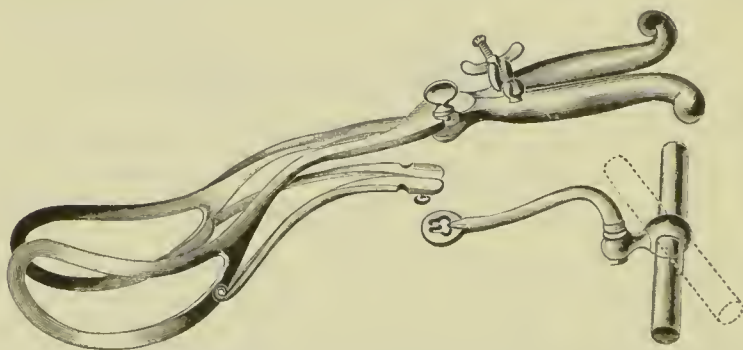


FIG. 40.—Lusk's modification of the Tarnier forceps (the traction-rods are shown free from the catches that hold them during application of the blades and ready for attachment of the tractor).

Reascertain the position of the head, disinfect and warm the forceps, grease or oil the *outer* surface of the blades; avoid all display, flurry, and “clang” of the instrument.

Indispensable Conditions.—These are four: first, the os must be dilated or dilatable; second, the membranes should be very freely ruptured; third, the pelvis must not be too narrow; and fourth, the forceps should be applied to the child's head, and in rare cases to the pelvis.

General Rules.—I. The blades must be applied to the sides of the head, so that their concavity shall be as nearly as possible toward that part of the head which is to be brought under the pubic symphysis. There is an exception—namely, when the occiput is posterior. The application of the blades in relation to the pelvis is either *direct*, *oblique*, or *intermediate*.

Direct, when the head has perfected its movements of rotation. The blades, placed in the transverse diameter of the pelvis, are then parallel with the floor of the pelvis and with the head, which is seized by its biparietal diameter. The application is then *direct*.

Oblique, before rotation has taken place.

Intermediate, when the head, at the superior strait, has its long diameter parallel with the transverse diameter of the pelvis. The forceps should then be so applied as to embrace the head in a *diameter intermediate between the transverse and the oblique* (Charpentier). In this case one blade will seize the head at the posterior part of the parietal bone, and the other at the side of the opposite frontal boss. At these points the marks of the forceps may plainly be seen after delivery in the above position.

Should it be attempted to place the blades transversely, it will be discovered that they will of themselves glide in the direction of the *intermediate diameter*, toward that part of the pelvis where there is room unoccupied by the head;

that is, toward the sacro-iliac joint and the anterior region of the pelvis, opposite the acetabulum.¹

II. The *posterior blade* must generally be applied first. Which blade is this? When the head in the excavation is in an oblique position, apply first the blade that corresponds with the posterior extremity of that oblique diameter, both extremities of which are unoccupied by the head. Supposing the occiput to be to the left of the pelvis and anterior, the head in this instance occupies

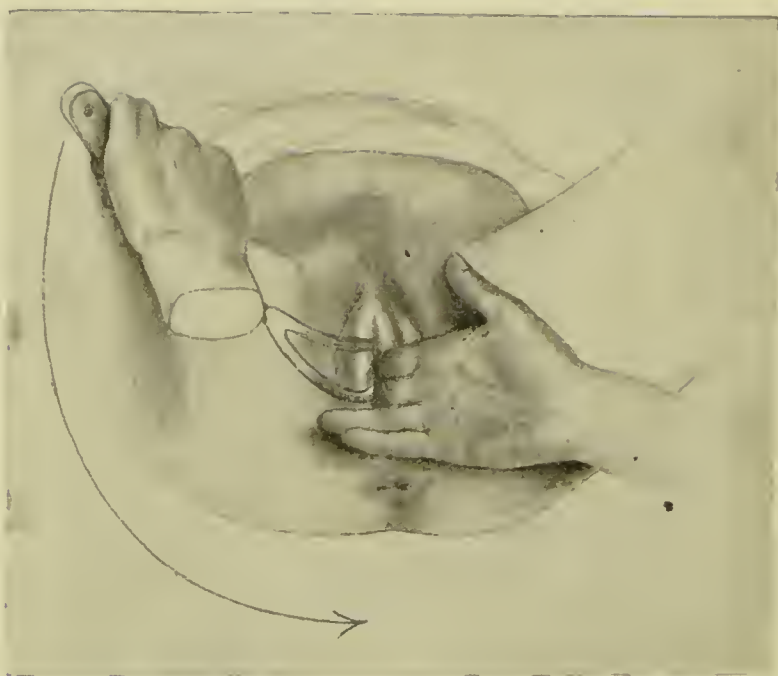


FIG. 41.—Method of lightly grasping and placing the lower blade for application. The arrow shows the arc followed by the handle as the blade passes upward (Dickinson).

both extremities of an oblique diameter, and both extremities of the biparietal diameter are free and unoccupied by the head; therefore the posterior blade must be applied first opposite the left sacro-iliac joint, which is the

¹ Before proceeding, articulate the forceps outside of the vulva, and see what position they should occupy when articulated in the pelvis.

posterior extremity of the biparietal diameter. The second blade should be applied to the anterior extremity of the biparietal diameter, opposite the acetabulum (Pinard's rule). In difficult cases, however, apply first the anterior blade, as the presence of the posterior blade in the vagina will greatly embarrass and retard the introduction of the anterior blade if the head be still high. In other words, if the head be oblique apply the forceps in the opposite oblique diameter (Playfair).

III. The *male, left, or pivot blade* should *always* be held in the *left* hand and applied to the *left* of the pelvis;

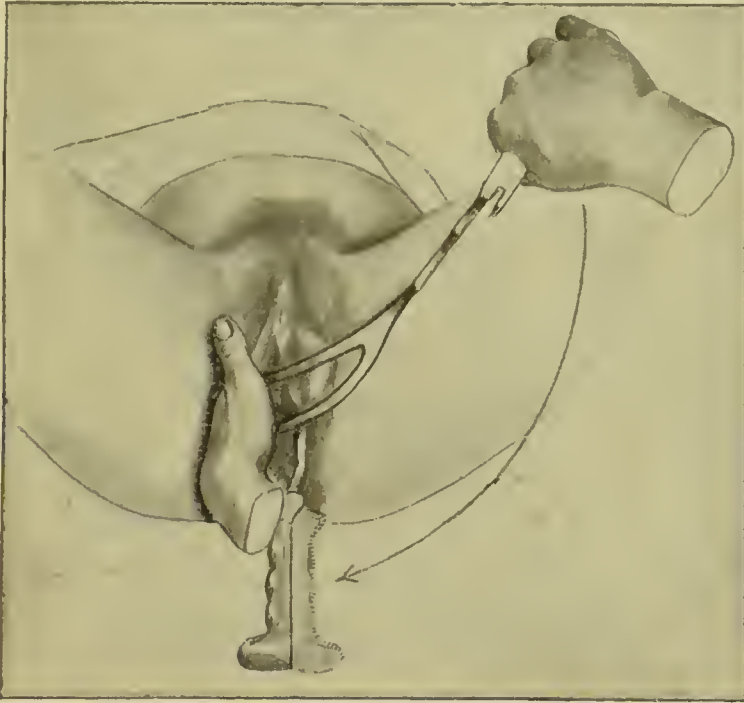


FIG. 42.—Beginning application of the second or upper blade. The handle follows the direction of the arrow to reach the position shown faintly near the first blade in place (Dickinson).

the *female, right, or mortise blade*, *always* in the *right* hand and to the *right* of the pelvis. In other words,

right blade to the right, right hand ; left blade to the left, left hand (Figs. 41, 42).

IV. The hand opposite the one that holds the branch should *always* be introduced in the genital tract to guide the blade. When the head is at the superior strait chloroform the patient, introduce the whole hand. With the head at the inferior strait introduce the whole hand except the thumb. In pushing up the blades when the head is high, an assistant should depress the fundus of the womb, and thus bring the child's head toward the hand. The operator will thus avoid perforating the uterus or separating the vagina from it.

V. *To what part of the pelvis* should the blade be first introduced? The first blade, with its convexity in the hollow of the hand, is to be guided from below upward until it reaches the sacro-sciatic ligament, and then gently be pushed in and upward. The second blade is to be applied with a spiral movement, which causes it, when, guided by the hand, to move slowly and gently around the head in an oblique line from below upward until it rests against a parietal boss. This movement, easy of execution, is not possible when the head is above the superior strait; then both branches must be applied transversely or very obliquely in the *intermediate diameter*. When the head has perfected its movement of rotation and has descended to the floor of the pelvis, this spiral movement is no longer necessary.

VI. The *second blade* should *always* be introduced above and in front of the first, so that the male or left blade will in some cases be found above; then, in locking, gently uncross the blades or raise the second blade by drawing it out a little, slip the posterior blade under

it, and locking will be effected without uncrossing the blades (Stoltz).

VII. Introduce the blades only in the *intervals between contractions*.

VIII. *No force* should ever be used in pushing up the blades. When properly directed they penetrate with the greatest ease; they appear to be sucked in, as it were. Obstacles may exist from the folds of the scalp or of the vagina, or the blade may not be in the line of the pelvic axis and may strike against the vaginal walls. In these cases be particularly gentle and prudent, especially if the head be at the superior strait. Make tentative efforts; vary the direction of the instrument a little. An assistant must press down the fundus. Withdraw *the blades in an opposite direction* to that which they traversed in their introduction.

IX. The first branch being introduced, give it to an assistant to hold in position. This assistant must be able and not envious, for he might defeat all our attempts. The second branch is introduced above the first; if well directed, they will lock easily; if not, it is because they have not penetrated deep enough or because one of the blades is everted. Grasp the articulation gently with the hand. *No forced locking*. It is better to withdraw and reapply the blade many times than to force locking.

X. Be sure that the head alone is properly secured without embracing a limb or a loop of cord, etc.

XI. *Tractions* must be made in the axes of the pelvis (Fig. 43). Imitate nature. When the head is at the superior strait make tractions backward and downward, bringing the head into the excavation. The Walker or the Pajot forceps is excellent for this purpose. The

head once in the excavation, the tractions should be less backward, next be made gradually in an almost horizontal direction, and finally upward. When the head is at

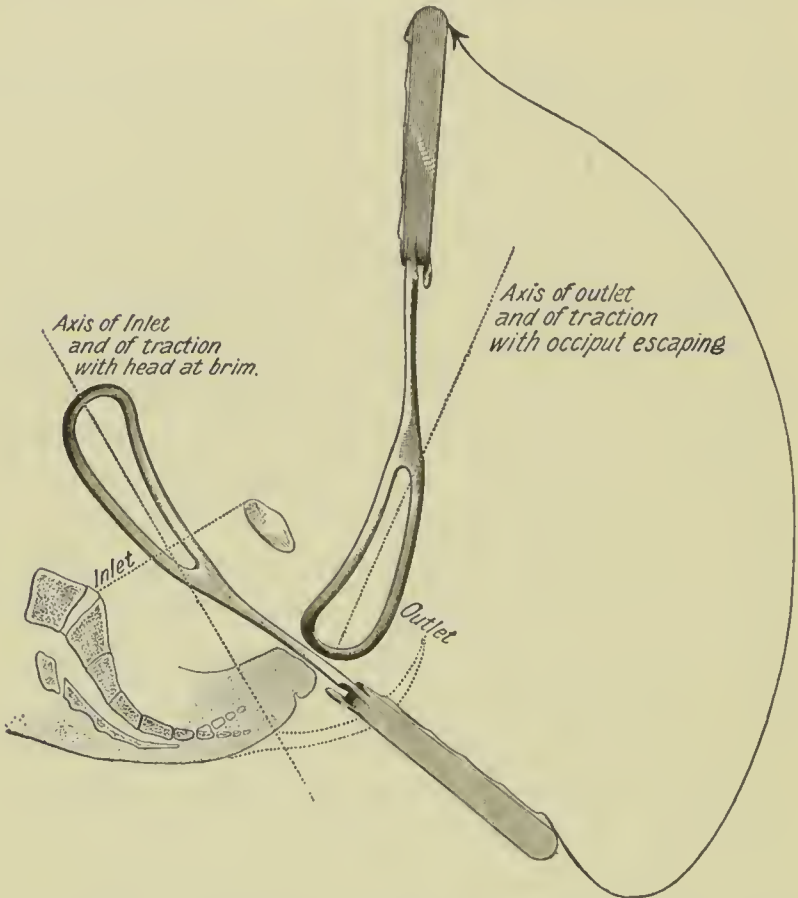


FIG. 43.—Axis of traction in the high operation corresponding with the axis of the inlet. Direction of the traction, as the forehead escapes, is nearly at right angles to the long axis of the mother's body. The arrow follows the course taken by the end of the handle (Dickinson).

the vulva the handles of the forceps are gradually raised to the woman's abdomen to facilitate extension (Fig. 44). *No more traction* is needed or only very *little* longer. Support the perineum; distend it very slowly and in an *intermittent* manner. If very rigid, make two incisions

half an inch in length, directed backward and obliquely on each side of the vulva, not in the centre of the perineum nor transversely, but *obliquely* (episiotomy). These incisions will retract very soon. *Check with the forceps*



FIG. 44.—Upward traction when the occiput has passed the pubic arch and the pelvic floor is on the stretch (Dickinson).

the too rapid delivery of the head. When the vulva is much distended, disarticulate the forceps and seize the blades quite firmly near the articulation. This procedure will greatly diminish the space between the blades and prevent a laceration of the perineum or of the vulva (Stoltz), and it will enable the obstetrician to leave the forceps on with safety until the final delivery of the head; otherwise, he might lose the credit of the ope-

ration; besides, a few slight tractions may be required at the last moment of the operation.

Extract during a pain, in order to keep the head flexed. If pains are absent or deficient, do not wait for them, but extract cautiously and slowly, imitating nature, in an intermittent manner, as rapid extraction might cause inertia and subsequent hemorrhage. When the head is clearing the vulva, extract *between* two pains. At the superior strait especially one should extract slowly, giving time for the moulding of the head. To excite contractions employ uterine massage according to the Kristeller or the Dublin method.

During extraction from the superior strait make very gentle oscillatory movements laterally, avoiding a pendulum movement, which might injure the soft parts of the mother.

When applied obliquely, *watch the lower blade*, which might cut the perineum. Place a finger under the lower blade until rotation has taken place.

When extending the head keep the blade *very firmly* applied to the parietal bosses, else the blades will slip back over the child's face and cut the perineum. Extension by the blades is not possible unless the parietal bosses be firmly embraced with a moderate amount of compression.

In oblique or transverse positions, when the head is engaged at the superior strait, first exert traction, and when the head is fairly in the excavation rotate it, so as to bring the concave margins of the blades directly in front. Use no violence. Generally the head turns in its descent, carrying the instrument along with it in the rotation. The head will sometimes rotate within the blades of the forceps.

Through the *dynamic* or *oxytocic* action of the forceps the application of one or two blades will sometimes suffice to cause the rotation. This dynamic action is at times so great as to prove a serious obstacle to the introduction of the blades. When the head is born remove one blade after the other, and wash and disinfect the forceps with alcohol—an excellent germicide, as is also boiling water.

What amount of force should there be exerted? Generally very little, especially if we use Tarnier's forceps. The facility of extraction with this instrument is much in its favor. However, in some cases, when the head is high, considerable efforts are required. Steady one foot against the bed; see that the floor is not slippery, otherwise there is danger of falling backward.

Before proceeding articulate the forceps outside of the vulva, and see what position they should occupy when articulated in the pelvis.

Special Rules.—With the head at the inferior strait in an occipito-pubic position make a direct application of the forceps—*left blade, left side, left hand; right blade, right side, right hand*; articulate and deliver as above recommended.

Occiput to the left or to the right, anteriorly, make an oblique application, rotate, etc.

Occipito-sacral position, apply same blades in same manner as in occipito-pubic position; rotate occiput very gradually forward and deliver it under subpubic arch. When, in this rotation, the head has been brought into the transverse diameter of the excavation, remove the forceps and reapply the blades, so that their concavity be toward the occiput, which is to be brought forward; else by continuing this forward rotation without remov-

ing the forceps, its blades with their concavity backward might lacerate the perineum.

In *occiput to the right or to the left sacro-iliac synchondrosis*, rotate, flex, and extend as above.

If this forward rotation of the occiput is impossible, rotate it backward into the hollow of the sacrum, and make downward traction until the occiput reaches the perineum and the forehead begins to appear against the pubic symphysis; then *flex the head strongly*, make upward traction until the occiput is clearing the posterior commissure of the vulva. At this moment *depress the handles of the forceps as much as possible*, and extract by extending the forehead, face, and chin under the subpubic arch; then deliver by flexion.

In these cases the perineum is greatly distended and in great danger of rupturing unless we strongly flex and extend the head at the proper time, as described above.

Conversion of an Occipito-posterior Position into One of the Face.—If the perineum be very much relaxed or has been ruptured in a previous labor, the child small, and the vagina ample, try by backward traction to convert the occipito-posterior position into one of the face, and deliver by continued extension until the chin passes under the subpubic arch, then flex.

Forceps in Face Presentation.—The child cannot be born unless the chin passes under the subpubic arch, as this is the only part of the pelvis which can subtend the child's neck; in any other position of the chin in relation to the pelvis the child will descend only *as far as the length of its short neck will allow it to descend, and no farther*. The labor will then be arrested and the delivery rendered impossible unless the chin rotates forward.

If no spontaneous rotation takes place, the forceps must be used, the concavity of the blades being toward the chin, which is brought to the subpubic arch. The tractions must be made backward to extend the child's head; when the chin, rotated to the pubic arch, is clearing the latter, the forceps must be raised and the head be delivered by flexion.

Chin Posterior in the Excavation.—Rotate it forward. As soon as it has been brought halfway around, remove the forceps and reapply with the concave borders toward the chin. The manœuvre is the same as that practised in forward rotation of occiput-sacral positions. If it be impossible to bring the chin around, move it into one of the sacro-sciatic foramina. The chin will push before it the soft parts which cover the foramen, which will permit of flexion and rotation of the head, thus converting the position into one with the occiput anterior.

If the conversion be not effected in the manner just described, it may yet be accomplished by art, especially if the patient have a lax or ruptured perineum. Backward traction should be made with the forceps. When this measure is successful, it is much safer for the child than extensive forward rotation of the chin.

If all the above measures fail, incise the perineum obliquely on both sides to the extent of an inch, and extract the child's chin posteriorly by backward traction (Isaac Taylor's method). If this fail, no alternative is left but the Cesarean operation or symphyseotomy if the child be living, and, if dead, craniotomy. The perineum is in great danger of rupturing in such cases.

Chin Posterior at or above Superior Strait.—In this

event there is no alternative. (The head cannot be born in this position.) The forceps will not avail. Version must be performed.

Forceps in Transverse Position.—Take, for instance, a case where the occiput is to the left side of the pelvis, and the head, engaged in the superior strait, has descended below the promontory of the sacrum. Here the posterior or left blade is to be introduced first and pushed toward the left sacro-iliac articulation, and when it has penetrated to the proper depth it is pressed backward into the hollow of the sacrum by bearing on its concave margin with the fingers of the right hand, already in the vagina. The female or right blade is next to be passed up, by means of a spiral movement, behind the right acetabulum; then the left hand in the parts must endeavor to work the right blade toward the median line by pressing on its convex margin, so as to get the blade just behind the symphysis pubis (Cazeaux's method).

The head, then, will be embraced by its biparietal diameter; then make a few backward tractions and rotate the occiput very gradually from left to right toward the subpubic arch, where it can be delivered by flexion and extension. The operation should be performed slowly and with care, on account of the great extent of the rotation. It can be successful only when the greater circumference of the head has descended below the sacro-vertebral angle. This interesting and useful application is greatly facilitated by the use of Baumer's forceps, especially devised for this manœuvre.

The Head merely Engaged at the Superior Strait.—The head may be locked at the inlet of a moderately

contracted pelvis, and is in this case generally in a transverse position. Chloroform the patient, introduce the whole hand, and apply the forceps in the direction of the axis of the superior strait, the blades occupying a diameter intermediate between the conjugate and oblique. An assistant presses down the fundus uteri. Grasp the head very firmly. A certain amount of compression is required to secure the hold of the forceps, which should be a long one.

Before attempting rotation in such a case make traction as far back as possible, or a long diameter of the head will be placed in a short diameter of the pelvis, and thus render the delivery impossible. Use a long forceps with a marked pelvic curve, such as Lusk's and Wallace's, or preferably Pajot's. Grasp the instrument with the left hand placed above the articulation; use this hand as a fulcrum to push the head downward and backward in the direction of the axis of the superior strait; assist this descent of the head with the other hand on the extremities of the handles, and when the head has reached the inferior strait begin rotation (not before); combine the rotation with traction. This is the well-known Pajot movement, and gives excellent results.

The Tarnier axis-traction forceps will enable one to perform this difficult delivery with far more ease than the classical forceps. But when the head is on the perineum this forceps must be laid aside and be replaced by an ordinary forceps. The Tarnier, the Wallace, or the Bethel forceps, so useful when the head is high, will enable one to bring the head from the superior strait to the floor of the pelvis, but may cut the perineum, sometimes deeply, on account of its great and abrupt pelvic curve. Pajot's, or the Lusk axis-traction forceps, or the

writer's forceps, with its gradual pelvic curve, is safer; so is Hodge's or Elliot's or the Simpson-Neal forceps when used in the excavation.

Forceps with the Head Movable above the Superior Strait.—In this case the pelvis is more or less contracted, or the head may be very large or hydrocephalic, and version is to be preferred to the forceps. Version here is much safer for both mother and child. When version is not possible on account of the retraction of the uterus after the complete evacuation of the amniotic fluid, the forceps may be tried, and should be applied very obliquely in the intermediate diameter mentioned before. The locking then will be in the vagina. The womb should be firmly grasped by an assistant and pressed down so as to fix the head at the superior strait, because the great difficulty here is the mobility of the head. The tractions are made in the line of the superior strait, as much backward as possible, with a Pajot or a Wallace forceps, until the head has cleared the promontory and descended to the level of the inferior strait; then one should rotate to the pubis, etc. This operation, which is very fatiguing, requires much time in its performance, and time also to allow the head to mould itself.

During this operation frequently auscultate the heart of the child, and if its death is well ascertained, the only resource left will be craniotomy in case of failure with the forceps. But if the child be living, the Cesarean section should be performed.

Premature Extension of the Head.—In premature extension of the head in the excavation, forceps should be applied in order to promote flexion. The forceps should then be withdrawn, and be reapplied so as to

perform posterior extension of the head in the excavation (as recommended by Michaelis), by raising the forceps to the front of the woman's abdomen, thus delivering the child by normal and *final extension* as usual.

Forceps in Head-last Cases.—In breech presentation, after turning, if the base of the cranium is arrested

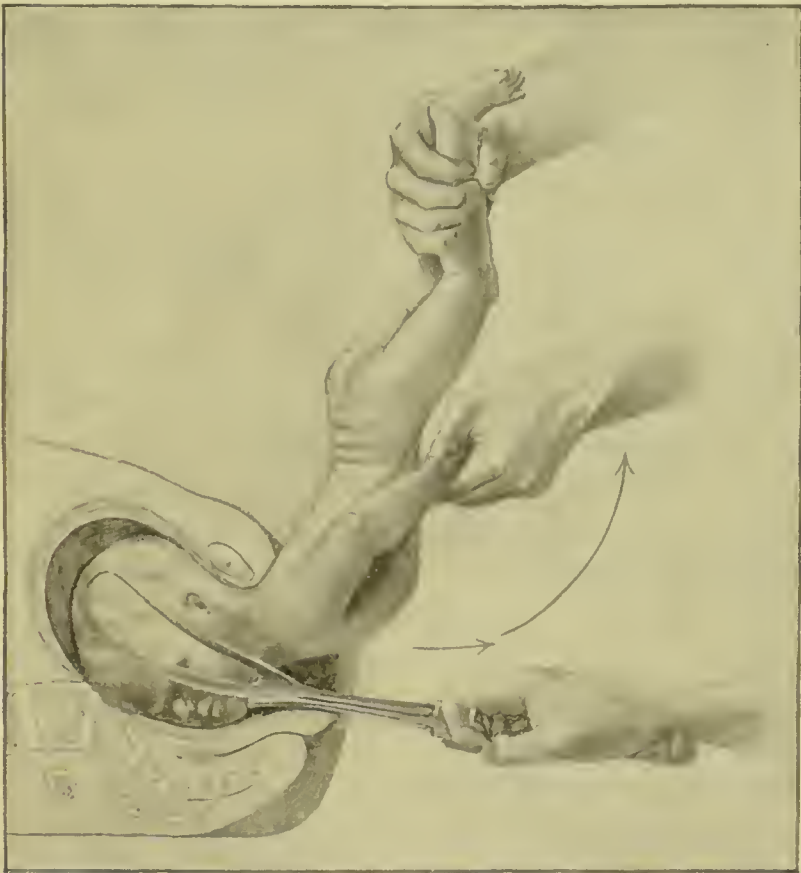


FIG. 45.—Forceps extraction of the after-coming head: the arrows show the direction of traction (Dickinson).

by a contraction of the pelvis, or if we fail to deliver the head by the usual manual method, the forceps may certainly prove very useful.

The rules for application are the same as in vertex

presentations. If the occiput is anterior or transverse, the blades should be entered along the sternal plane of the child. The body, surrounded by a towel to prevent slipping, should be raised by an assistant toward that side at which the occiput is situated, and the head delivered by flexion (Fig. 45). When the occiput is posterior the blades should be applied to the dorsal plane of the child, tractions made backward until the occiput reaches the pelvic floor, then the forceps raised and delivery effected by flexion.

When the face is in front and above, rotate the occiput to the pubis; if this be not quickly successful, free the occiput and deliver the head by posterior extension within the excavation (Michaelis).

When in breech presentation the head is arrested above the superior strait by an unusual extension or a contracted pelvis, the delivery is much more difficult. In this case carry the trunk toward the part corresponding with the occiput; depress the chin as much as possible, with the view of diminishing the extension of the head; enter the blades obliquely on the sides of the pelvis, and operate in the direction of the pelvic axes. Action here should be decisive and rapid, as a few minutes will decide the child's life or death.

Forceps on the Breech.—After failure with a fillet or skein of worsted or a handkerchief passed over the child's groin and with the usual manipulations, if the breech remain impacted and the pains are too weak to overcome the resistance of the perineum, the forceps may be applied to the breech. One blade should be placed over that trochanter which is found posteriorly, and the other over the side of the sacrum, with its extremity just above the crest of the ilium.

A straight forceps or one with a very moderate pelvic curve is preferable for this application. Great care should be taken to avoid contusing the child. There is danger to the child in this application, but not more than with the blunt-hook passed over the groin, which also may contuse the soft parts of the child, and fracture its thigh besides.

If a prolonged cessation of the pulsations in the cord prove that the child is dead, the forceps should still be applied to the impacted breech for the relief of the mother.

How Long to Wait before Applying the Forceps.—If the head be engaged at the *superior strait* in a moderately contracted pelvis, if the condition of the woman be good, the pains sufficient, and no accident threaten her life or that of the child, wait from six to eight hours in order to give sufficient time for the moulding of the head. Frequently auscultate the child's heart. So long as its beats are strong and regular there is no danger. If the beats of the heart become feeble, and especially if they intermit, apply the forceps at once.

When the head in the *excavation* has made no progress for one hour, deliver it with the forceps, for in this case the pressure on the mother's soft parts may prove disastrous, and the compression of the head of the child may produce such changes in its cerebral circulation as to cause its death before or soon after delivery.

If the labor be complicated by any serious accident, the forceps should immediately be applied, but never to save the time or to promote the convenience of the physician.

Frequency of Forceps-application.—This will depend upon the character of the cases of midwifery one

is called upon to attend. In ordinary practice there will be found an indication to apply the instrument in about one case in twenty; if engaged in consultations in difficult cases, the forceps will have to be used in one out of five or six cases.

Limitations of the Forceps.—When the pelvis has at least $3\frac{1}{2}$ inches in the sacro-pubic diameter the forceps should be used if the top of the head presents in a transverse position. The podalic version or symphysectomy should be performed when the sacro-pubic diameter is between $2\frac{1}{2}$ and 3 inches. In the former operation the base of the head is made to enter the contracted pelvis as a wedge (Simpson). A timely application of the forceps to the after-coming head may then bring the labor to a happy termination. The podalic version should also be preferred in direct antero-posterior positions at the superior strait; in inclined or irregular positions of the top of the head; in face presentation with the chin posterior; in trunk presentations and in contraction of the inferior strait attended with a narrowing of the subpubic arch. In the oblique-oval pelvis version is the rule (Naegele). Great care should be taken while extracting to turn the child, so as to place the occiput, which is the widest part of the child's head, in the wide part of the pelvis. When the head has reached the inferior strait the forceps should be applied to the after-coming head rapidly but cautiously, to save the child's life.

The forceps should also be used in prolapse of the cord when the head is in the excavation and version is no longer possible. Version is preferable in prolapsed cord when the presenting part is high. Lose no time in futile attempts at reposition of the cord, as this procedure is often difficult and the attempts will usually fail; per-

form version if the presenting part be high, apply the forceps if it be low.

The forceps should be employed in all accidents calling for speedy delivery when the head is in the excavation. Version in these cases is to be preferred if the head be but little or not at all engaged at the superior strait, unless the womb be so firmly contracted as to render introduction of the hand very dangerous or impossible; the forceps may then be used. Its application under these circumstances will certainly be very difficult, yet it has occasionally succeeded in delivering a living child. The Cesarean section should be done if delivery with forceps be impossible and the child be still living.

With an antero-posterior diameter below $2\frac{1}{2}$ inches neither forceps nor version should be thought of. The Cesarean section or one of its modifications should be performed, as it is not more dangerous to the mother than craniotomy if performed early, and as it gives the child some chance. The Porro operation may be done if the uterus is much damaged (Sanger, Leopold, Tait, Buscy, Howard A. Kelly, Harris, Charles P. Noble, etc.).

Forceps to the Dead.—If an accident, such as apoplexy, eclampsia, hemorrhage, pulmonary emphysema, etc., should cause sudden death of the woman before the termination of her labor, the child should be delivered by the forceps as speedily as possible, or, if this be not possible, by version; and if this be impossible, the Cesarean section should be performed as soon as the mother's death is surely ascertained. If possible, have a witness present, preferably a physician, in order to establish the facts of the patient's death and thus avoid a criminal prosecution. A living child may thus be extracted even

half an hour after the mother's death. In this instance a forcible dilatation of the cervix may be necessary, and is perfectly justifiable, as it allows of version preferably to the forceps. As there is a possibility of the woman being only in a state of apparent death, syncope, catalepsy, etc., the operation should be performed with the same care as though she were living.

Version or the forceps may also be resorted to in some instances, in cases of ruptured uterus, before the fetal parts have receded into the abdominal cavity beyond reach. If impossible, perform laparotomy.

CHAPTER VI.

CESAREAN AND PORRO OPERATIONS, AND LAPAROTOMY.

The **Cesarean operation** consists of incisions made through the abdominal and uterine walls of a pregnant woman and the extraction of the fetus through the opening thus made, in order to save the life of the mother and that of the child.

History and Statistics.—This operation, which is one of the gravest in surgery, is very old. Pliny cites the names of several celebrated men who by this procedure were delivered from their dead mothers. Among those born *à cæsà matre* were Scipio Africanus, Manilius, and Cæsar, after whom the operation was called. Shakespeare speaks of "Macduff . . . from his mother's womb untimely ripped." The *lex regia* enacted by Numa Pom-

pilius made it obligatory upon the physician to remove the child by abdominal section in case the mother died during pregnancy, in order to secure citizens for the state.

Cesarean section is reported to have been performed in 1491 by Nicola de Falcon. Rousset, in 1581, had performed it sixteen times, always successfully, six of his operations being on the same woman. Scipio Murunia affirms that it was as common in France in his day as bloodletting was in Italy, where patients were bled for almost every disease. However, a reaction soon followed, headed by Guillemeau and Ambroise Paré, who failed in their attempts at Cesarean section. Dr. Bretonneau of Tours performed it successfully five times on his own wife. In Philadelphia it was performed three times successfully on the same woman.

Lungren collected 119 cases of Cesarean section performed on 48 women; among these a number had undergone the operation several times. According to Barnes, success in second operations is due to protective adhesions formed within the abdominal walls, closing the peritoneal cavity, and, in the event of a second section, the incision just reaching these adhesions.

Frerichs relates a very interesting case in which he performed a Cesarean section on account of a contracted pelvis, both mother and child being saved. The woman became again pregnant, and premature labor was provoked at the eighth month of gestation. When the labor began the uterus ruptured; gastrotomy was performed to save the child. Vomiting caused the bowels to protrude, and in order to reduce them numerous punctures were made through them, permitting quantities of gas to escape. Notwithstanding these punctures,

the intestines could not be replaced until an incision was made through them, which allowed of the escape of great quantities of fecal matter. The intestines were finally replaced and the wound closed. The woman made a perfect recovery. In mentioning this case Barnes pertinently asks, How many women would show such an amount of tolerance?

The earliest successful operation upon a living woman was done in 1498, and was performed by Jacob Nufer, a Swiss and a spayer of cattle, on his own wife, who was in great danger. Six women are reported to have practised the operation on themselves, the greater number successfully. Since 1646 there have been no less than 11 women far advanced in pregnancy who have been made subjects of gastro-hysterotomy by ribs of cattle-horns, with the escape from death of 8 women and 5 children (R. P. Harris). The *Edinburgh Medical Journal* of April, 1884, gives the report of a case by Rev. R. W. Felkin, a missionary in Uganda, Central Africa, who witnessed the successful performance of a gastro-hysterotomy by a native operator. Before the operator took up the knife he washed the woman's abdomen and his hands in palm wine, a good antiseptic, extensively used also by the Egyptians in their processes of embalming. After the operation the dusky surgeon closed the abdominal wounds with long pins and the figure-of-eight suture, as was done in the operation for hare-lip five hundred years ago.

Three midwives have performed the operation with the result of saving three women. In Ohio the section was once made, with the aid of two women, under the light of a tallow candle, and the patient recovered. Under similar circumstances and without the use of

antiseptics the operation was performed by an Illinois country doctor in a miserable log cabin. He sutured the wound with a darning-needle and coarse thread; this woman was also saved. In Belgium it has been done five times with a razor. Many similar instances of hazardous but successful Cesarean sections could be cited. But it must be noticed that these operations were performed in the country or in small villages, where the purity of the atmosphere favors asepsis. The same fortunate terminations do not, however, always follow in large cities, even with the best antiseptic precautions.

Dr. H. H. Mudd of St. Louis recently performed Cesarean section in a case of labor complicated with locked twins where the forceps had failed to move the head of one of the twins. Both children were removed alive. The mother, however, on account of her hard and prolonged labor, died of exhaustion—a result not to be charged to the operation, which proved on autopsy to have been perfect.

Indications.—The operation is indicated whenever the natural passages through which the child has to be born are so narrow or so obstructed that a delivery by the application of the forceps or by symphyseotomy is wholly impossible, while the mutilation of the child itself would not permit its extraction without exposing the mother to the greatest danger. It may likewise be resorted to for the purpose of saving the infant when the woman dies in an advanced stage of gestation (Cazeaux).

The indications for this operation are either *absolute* or *relative*: *absolute* when the smallest diameter of the pelvis does not amount to $2\frac{1}{2}$ inches, as a delivery of a living child through the natural passages is then impossible, even with symphyseotomy, and we have to choose be-

tween hysterotomy and mutilation of the child, the latter being the more dangerous to the mother (Churchill, Bedford). The indication is *relative* if the smallest diameter of the pelvis measures $2\frac{1}{2}$ inches, and if it has positively been determined that the child is living. We have then to choose between embryotomy, symphyseotomy, and the Cesarean section. Dubois and the majority of the French accoucheurs are in favor of the latter. The great Stoltz could never make up his mind to destroy the unborn child, and several of the most eminent Germans are guided by the same convictions. But, unfortunately, there exists in France a school of less conservative men, headed by Pajot, who strongly advocate the practice of the English accoucheurs, and the "murder of the innocents" is by them boldly taught. The English do not admit the Cesarean section as an alternative, although some of their highest authorities, Churchill, Barnes, and others, agree that with a pelvis contracted to $2\frac{1}{2}$ inches craniotomy is as dangerous to the mother as the Cesarean operation. The latter should therefore be chosen, as it gives by the modern improved methods 90 recoveries among 100 women; in the hands of Leopold 95 women were saved out of 100, and most of the children were removed alive. This fact should certainly cause British obstetricians and all craniotomists "to reconsider an opposition which, by reason of a lessening mortality under the knife, is becoming more and more groundless from year to year" (Harris).

If time and circumstances permit, one or two physicians should be called in consultation. But if the operation has to be performed in the country, without antiseptic precautions and without a full corps of assistants, the operator will be most likely to succeed if he does not

waste time in sending for distant aid. If he is confident that the operation is demanded, he may at once proceed with the aid of one physician and a few women. By the use of hot spring-water for cleansing and the aid of a woman to thread the needles he may make even an excellent substitute for the most improved technique of asepsis and the multiple uterine suturing (Harris). Then the country patient has in her favor the free circulation of pure air.

Tait has remarked that this operation is the easiest one in surgery, and that any practitioner with an ordinary surgical-instrument case should be able to perform it.

The Cesarean operation should never be performed without first explaining its necessity to the mother. Her consent should be obtained, and be expressed in the presence of competent witnesses, as a protection to the physician against suits for malpractice. But the mother is not obliged to give her consent, for no one is bound to expose one's self to extraordinary risks of life in order to save another's life, and if one chooses to take the risk it is simply an act of heroism.

Cesarean section in case of puerperal eclampsia should be performed when the symptoms are very grave, the woman in a state of prolonged and deep coma, almost asphyxiated, the os remaining closed, so as not to admit of the use of the forceps or of version; or if there should be a cancer or some tumor completely obstructing the labor, and the convulsions should not yield to medication or to surgical interference. In these cases the Cesarean section should be performed as early as possible.

In Holland the operation has been performed 10 times for eclampsia, as advocated by Halbertsma, with the result of saving 85 per cent. of the mothers and children.

The writer, before he had learned to resort to this procedure, lost an eclamptic patient, who, notwithstanding the usual treatment, died comatose before the os was dilated enough to allow of the use of the forceps or the performance of version. As soon as her death was ascertained Cesarean section was performed, and a living child was removed which soon died.

Among the risks in operating and causes of failure are delays due to futile attempts at delivery, exhaustion where there is no advance of the labor, uterine hemorrhage from inertia, cardiac embolus, and death by collapse. Peritonitis is also a cause of death, but the danger from this source has greatly diminished since the adoption of the rule to close the uterine wound by deep and by superficial multiple sutures, thus preventing the entrance of blood and lochia into the peritoneal cavity.

The Operation: The Classical (Mauriccan) Method.—The moment selected for operating is that which precedes or immediately follows the rupture of the membranes. The dilatation is then advanced, and the uterine contractions, already begun, are of sufficient intensity. The patient is chloroformed, the bladder and rectum are emptied. The woman's abdomen is thoroughly washed with soap and water, and subsequently with ether. The instruments are immersed in a 5 per cent. solution of carbolic acid, in which the hands of the operator and assistants must also be rinsed. The sponges should be absolutely new, and should have been boiled or soaked for twenty-four hours in alcohol. The bed must be high and firm; the temperature of the room at from 75° to 80° F. Four assistants are necessary, and a nurse to receive the child. The assistants are to fix the uterus against the abdominal walls and keep the bowels and

epiploön within the abdominal cavity, and are to chloroform the patient. The operator brings the uterus to the median line, thus securing the linea alba on the uterus. The instruments to be used are straight, convex, and probe-pointed bistouries, a grooved director, scissors, hemostatic and ligature forceps, needles, and silk or silver sutures rendered properly aseptic. Chloroform, cold water, and ice-bladders are also needed.

An incision 5 inches in length is made from the umbilicus toward the pubis, the incision stopping at $1\frac{1}{2}$ inches from the superior edge of that bone, so as to avoid the bladder. If the umbilicus is not high enough to allow of this length of incision, the latter must be continued toward the left in order to avoid the suspensory ligament of the liver and an abnormal anastomosis which might exist between the umbilical and epigastric veins. The cellular tissues and aponeurosis are cut through. The peritoneum is then opened and the uterus is seen, which is easily recognizable by its wine-lees color.

The flow of blood from the incision is arrested with hemostatic forceps. Two fingers raise the peritoneum to guide the knife (Winckel), thus preventing the escape of blood and amniotic fluid into the peritoneum while making the division; the grooved director is still better. The epiploön should be pushed back behind the uterus. The Hyernaux ligature is useful in keeping the epiploön and intestines out of the way. This ligature is made by inserting in the upper part of the womb four long slack threads which are to be drawn upon before the uterus is incised or turned out, bringing this organ toward the ensiform cartilage, where it is to be held until the end of the operation.

The uterus is now divided, layer after layer, to the extent of about 4 or 5 inches, severing the deeper fibres of the organ and the membranes. The child is afterward quickly extracted, either by the head or by the feet, whichever is nearest the incision, which has sometimes to be extended to avoid lacerating the uterus if it has retracted too rapidly. This retraction sometimes permits the bowels to protrude; they should be reduced promptly by the operator. The child having been extracted, the placenta and membranes should be removed slowly, progressively, and *entirely*. Then uterine contractions are excited by two fingers in the womb, using rubbing and massage. All clots should carefully be removed, and the womb thoroughly washed with hot sterilized water. If hemorrhage continues, it should be controlled by ergot and small pieces of ice in the uterus.

According to the classical method, the abdominal walls alone were closed by sutures, although the suturing of the womb had occasionally been done by some operators. Lebas in 1769, Wiesel of Gülsenbusch in 1835, Godefroy of Mayenne in 1845, and, in America, Dr. G. Holmes in 1851 and Dr. Frank E. Polin of Springfield, Kentucky, in 1852, had done this suture of the uterus before the time of Säger, but uterine sutures were not adopted by all operators until recently.

Complications of the Operation.—The *placenta* may be found under the line of the incision, in which case the operation should be proceeded with as rapidly as possible. The incision should be enlarged if necessary, the placenta at once be loosened, and the child seized and extracted very quickly to save its life, which is in the greatest jeopardy.

The head may be arrested by the lips of the uterine or of the abdominal wound; the uterus is thereby prevented from retracting, and blood flows in torrents from the gaping sinuses: the incision should then be extended, the hand introduced, and the child extracted as rapidly as possible, as it may perish in a few minutes.

Hemorrhage is chiefly to be dreaded after the extraction of the child. It is caused by the absence of contractions, and it may be the gravest complication of the operation. We should apply all known means for checking the hemorrhage, such as simultaneous frictions and massage and applications of sponges soaked in iced vinegar (Naegele). According to Ritger, the uterus should be hooked at the superior angle of the incision and brought outside the abdominal wound, and should not be returned to the cavity until all hemorrhage has ceased. Ritger goes even farther when he advises that, in order to avoid this complication, the uterus should *always* be brought out through the abdominal wound, and recommends that the child should not be extracted before the uterus has been brought out, thus anticipating Müller. A compression by the hand on the neck of the uterus would also be of great service.

Adhesions of the Placenta.—The placenta should be detached by gently but rapidly peeling it off, leaving in the wound no shreds of the membranes nor clots.

Hernia of the epiploön or intestines must be reduced thoroughly before closing the wound. Depaul, in order to maintain the intestines in place, compresses the edges of the wound with large aseptic sponges; Ritger's method of turning the womb out would obviate this difficulty.

Entrance of Amniotic Fluid or Blood into the Peritoneal Cavity.—The amniotic fluid and blood should be soaked

out thoroughly with aseptic sponges. The toilet of the peritoneum and of the wound is that observed in ovariectomy, after which the wound should be sutured, provided the womb is completely retracted and all oozing of blood is arrested. Wait an hour two, if it be necessary, before suturing (Charpentier).

New or Improved Cesarean Operation.—The following technique is quoted almost verbatim from Dr. Robert P. Harris's valuable monograph on the Cesarean operation. Harris, as is well known, is one of the greatest authorities on the subject :

"To Dr. Max Sänger of Leipzig are due three important changes in the manner of closing the uterine wound—viz. 1. The use of a largely increased number of interrupted sutures; 2. The arrangement of the sutures into two rows, deep-seated and superficial; 3. The application of the sero-serous intestinal suture of Lembert to the uterine wound, so as to welt in the peritoneum

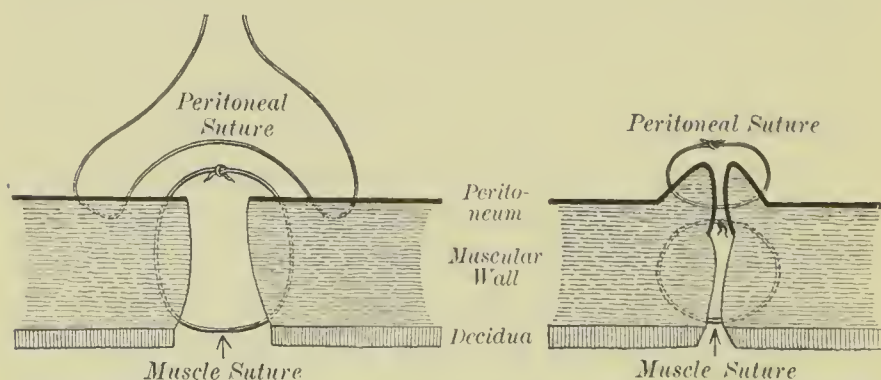


FIG. 46.—Diagrams of the peritoneal and muscle-sutures: *A*, before they are drawn tight and tied (modified from Fritsch); *B*, the two stitches after tying. The muscle-suture is buried and the upper suture folds the peritoneum together (Dickinson).

and secure an early union by maintaining the serous surfaces in contact" (Fig. 46).

A similar device was employed years ago by Sir

Spencer Wells in his ovariectomies. These sero-serous (symperitoneal) stitches are no longer thought necessary in closing the uterine wound; thus Säger's method has become much simplified. E. Fraenkel, who in 1892 published two further successful cases, considers that Cesarean section, in its improved and simplified form, can well be performed in private practice with but a small armamentarium and three assistants. Indeed, apart from the asepsis and the accurate suturing of the uterine wound, the details which at first were regarded as necessary have been abandoned. Barnes says: "All that is important is an accurate closing of the wound." The fact is, that Säger performed his first Cesarean operation in the manner described by Fraenkel—namely, the closing accurately of the uterine wound with the peritoneum edge to edge, and not by the symperitoneal suture, which method he first advocated in 1882. The woman recovered.

Harris continues by further describing the principal parts of the technique: "The abdomen is washed with warm water and soap, then with ether, and finally with a 5 per cent. solution of carbolic acid, the vagina being disinfected with the same. In hospital service the caoutchouc dam and apron, as employed by Prof. Howard A. Kelly of Baltimore, will be of great value, when placed under the patient, in conducting all fluids lost or used in the washing into a waste-bucket. The wound in the uterus is now to be closed by a number of deep-seated sutures of fine silver wire or aseptic silk; the number of the sutures varies from ten to thirty-five, followed by a row of superficial silk sutures. Before any of the uterine sutures are tied the uterine cavity is to be washed with an antiseptic fluid, and, if the cervix has not been well dilated,

drainage should be secured by the insertion of a utero-vaginal tube : abdominal drainage is not required, as there is no leakage when the closure is properly made."

The improved Cesarean method of Säger has worked a revolution in opinion as to the dangers of delivery by laparo-hysterotomy, and the advocates of craniotomy are being placed more and more upon the defensive. By prompt action, the use of antiseptics, and delivery by the improved abdominal method Germany has largely reduced the mortality of the Cesarean cases in her maternities ; and other countries have profited more or less according to the closeness of their imitation and faithfulness in carrying out the instructions she has given.

Dr. Metz of Aix-la-Chapelle, quoted by Cazeaux, several years ago reported 12 women out of 13 saved by the Cesarean operation. This was before the days of antiseptics, and his technique was of the simplest, but he always used ice-bags on the abdomen to guard against coming peritonitis. He insisted strongly upon this precaution.

Results attained by the Improved Cesarean Operation.—German operators, having exercised the greatest degree of care and having adhered the most rigidly to the technique, have saved the highest percentage of cases. Prof. Leopold of Dresden in his late reports records 95 women saved out of 100 ; which result is, however, a little better than the general result obtained by the total number of German operators, whose results show a mortality of 10 per cent. of the women and the same proportion of the children. Recent French tables shows similar results. Prof. Barton C. Hirst of Philadelphia, while comparing the mortality of symphyseotomy with that of the Cesarean operation, established the fact that the latter operation has not been so successful in America. This is

due to several causes, chiefly to delay or futile attempts at delivery by the forceps or otherwise. In Europe the operation is performed early. The mortality of the women in America amounts to 39 per cent., and that of the children to 5 per cent. Dr. Harris, however, observes that in the last five years a remarkable change for the better has taken place in the United States. The proportion of successes is daily increasing. Therefore, this operation should be performed much oftener than it is, without hesitation or groundless timidity, simplifying its technique in accordance with the latest advances.

Dr. Harris remarks that "the improved Cesarean operation cannot be made to work miracles," and that "its success largely depends upon the prior condition of the woman, her physical strength, and her hygienic surroundings."

Post-mortem Cesarean Section.—As regards the technique of this operation, it should be performed with the same care and caution as on the living. The mother might only be apparently dead or be in a state of lethargy or catalepsy. The death of the mother must be ascertained without a doubt; the life of the child must be established. It may live in the mother half an hour, some say longer, after her death. It may be stated that when the mother dies of sepsis or of some infectious disease the child dies before the mother. However, if at the death of the mother the os is found dilated or is dilatable, it were better to remove the child with the forceps or by version, as an easier and shorter operation, than by section. It is also less repugnant to the feelings of the relatives of the deceased, and we thereby increase the chances for removing a living child. Therefore it should be a rule to examine first before cutting.

Porro-Cesarean Section.—This operation consists in the removal, after the performance of the Cesarean section, of both the uterus and the ovaries. The conception of this operation originated with Cavallini (1769), and was subsequently adopted by a few others. Several cases are known where the uterus had been excised by ignorant persons without the occurrence of other grave accidents (Zufälle). In 1869, Prof. Horatio Storer of Newport (Rhode Island), who performed the Cesarean operation in a case of obstruction from a fibro-cystic tumor, was *forced* to remove the uterus to prevent the woman from bleeding to death. The hemorrhage was frightful. Dr. Storer ligatured the cervix, and, having applied the chain écraseur, slowly removed the mass. Both the child and the placenta were in a state of decomposition. The patient lived sixty-eight hours.

In 1876, Prof. Edward Porro of Pavia (Italy) performed his first operation, being impressed by the fine results obtained by Péan in ovariectomy and in the removal of the non-gravid uterus. Both the mother and the child survived. The patient had a rachitic pelvis, with an antero-posterior diameter reduced to $1\frac{1}{2}$ inches. Prof. Porro, in the presence of several colleagues, having ascertained that delivery was impossible through the natural passages, performed a Cesarean section. A frightful hemorrhage took place, and he, like Storer, was *forced* to perform an utero-ovarian amputation. With both operators the operation was suggested by an accident. Spaeth of Vienna had one success, which was soon followed by others.

The Operation of Porro-Cesarean Section.—Dr. Harris thus describes the details of the operation. Porro's incision was about 5 inches long. The uterus is turned

out through the abdominal wound, and is then held vertically until the iron-wire loop of a Cintrac constrictor is passed around the cervix at a point opposite the internal os uteri, and tightened by turning the screw; after which the cervix is to be cut through about 2 centimeters ($\frac{7}{8}$ inch) above the wire, and the mass removed. The abdominal cavity is next to be cleansed with carbolized sponges, and a 5-millimeter drainage-tube is to be passed through the abdominal wound and the Douglas pouch, and out by the vagina.

Numerous changes have been made in the operation since the initial trials by Porro. Thus, Dr. Levy of the Vienna Klinik recommends that the uterus be incised over a length of from 6 to 7 inches; that the abdominal wound be pressed together; that the constrictor be applied so as to include both ovaries; and that the child be extracted rapidly on account of the temporary asphyxia produced by the constrictor. A nurse or an assistant should immediately use the ordinary methods to resuscitate the child should it have been born in a state of apparent death. Great precautions are to be taken to prevent the entrance of fluids into the abdominal cavity. The stump should be trimmed with scissors and mummified with the perchlorid of iron. Spaeth cauterizes the stump with a 1:8 solution of chlorid of zinc, and subsequently applies a small gauze bag filled with solid perchlorid of iron. A free dusting with iodoform may be done. Litzmann recommends uniting of the edges of the stump by deep and superficial ligatures—a good means of preventing leakage. To prevent the ligature from slipping, two long steel pins should be passed through the cervix. This is the plan practised by Tarnier, who also passes figure-of-8 ligatures around the

pins. The stump is then returned into the abdominal cavity. More or less reaction is of course to be expected, and must be treated on general principles.

The advantages of the Porro (utero-ovarian) amputation are—(1) A sure, rapid, and permanent arrest of the hemorrhage even when the placenta is inserted on the anterior aspect of the uterus; (2) the extent of the uterine wound is reduced to the size of the pedicle; (3) the choice of the most favorable moment to operate, which is before the end of gestation, because uterine contractions to produce retraction of the uterus are not needed when this operation is done; (4) time is saved, because the utero-ovarian amputation requires less time than would be consumed in arresting the hemorrhage; (5) no new pregnancy is possible.

From an ethical point of view the operation is permissible in consideration of the good results to be obtained, and because it is allowable to sacrifice a part of the body to save the individual. Prof. Porro, in order to quiet the conscience of the most scrupulous, consulted the bishop of Pavia, who gave his approbation to the above operation. Prof. Spaeth says: "The women thus operated upon will not miss their wombs, and there are few among those that survive who would be willing to expose themselves to the risks of a new pregnancy."

The conjugal relations are not prevented by the operation. Some say that the operation might favor immorality, but the same objection could be raised against the removal of the ovaries when diseased. Could the husband or the wife sue the physician for malpractice? Porro says not. It would not be good policy to refer the question of operating to the husband, because it might be to his interest to get rid of his wife, and this might lead him

to consent to an operation which he knew to be extremely dangerous. Therefore both interested parties should be consulted by the physician, and their consent be obtained before competent witnesses, in order to guard against a lawsuit. Liberty, above all, should always be respected in this as in every circumstance; but by representing to the woman the absolute necessity for the operation her consent will surely be obtained.

Some Modifications of Porro's Operation: Müller's Modification.—The Müller plan consists in opening the uterus after turning it outside the abdomen, the abdomen having previously been protected against the admission of fluids, and the cervix having been constricted by an Esmarch bandage or iron-wire ligature. But if the constriction of the cervix produce asphyxia in the fetus, the operation should rapidly be completed after the constricting wire is drawn and the child be taken in hand for resuscitation. The Müller plan of operating has saved about one-half the cases subjected to it. The uterus cannot always be turned out after the long incision is made, and in this case the operation must be completed with the uterus *in situ* (Harris). Veit and Litzmann proposed changes which proved unsuccessful in every instance. A successful case is reported by Oppenheimer, who used *manual* compression instead of the Esmarch elastic tube. He also made use of Spencer Wells' ovariectomy clamp.

Results.—Up to 1890, 232 Porro operations had been performed. The procedure has been tested in almost all the countries of Europe, as well as in America, in India, and in Australia, with a maternal mortality of 57 per cent., and probably with 75 per cent. of the children saved, while the improved Säger method has given a mortality of only 5 per cent. of the mothers and of the

children only 10 per cent. Leopold, as stated above, saved 95 per cent. of the women and 90 per cent. of the children by the Cesarean operation. Dr. Harris states that recently the Porro operation has shown somewhat better results, with the prospect of having a lower rate in the future. But the results thus far have been so unpromising that there is a marked tendency to return to the Cesarean operation. The Porro operation is therefore not one of election. It should be reserved for those bad cases of rupture of the uterus in which the child has entirely escaped into the abdominal cavity, or for cases in which, while performing Cesarean section, the uterus is found so seriously damaged that it would cause certain death of the woman by putrid infection.

Laparo-elytrotomy is an operation which consists of making an incision over Poupart's ligament and dissecting up the peritoneum until the vagina is reached, when the latter is incised transversely, the cervix dilated, and the child extracted above the inlet. In 1806, Jörg devised this operation, which has been done since with indifferent success by Ritger, Baudelocque, and others. Dr. Gailard Thomas of New York, although not the original projector of laparo-elytrotomy, was the originator of the scheme that robbed it of the fatality which had always attended its performance in the hands of his predecessors, and he gave to it the value it now possesses (Harris).

The mortality from laparo-elytrotomy thus far has been 50 per cent., and is therefore much higher than that of the Cesarean operation. However, Prof. Skene of New York saved three women and four children by his four operations. This was an extraordinary proportion of successes, hardly to be expected from a less skillful operator. It is a difficult operation, and is not to be

encouraged. As it is not an operation of urgency, the reader is referred for further details to the latest text-books on this subject.

Laparo-cystectomy.—This operation is performed in case of advanced extra-uterine gestation in order to save the child without giving the mother additional risks. The entire sac and fetus are removed. For details consult text-books. It is not an operation of urgency.

Gastrotomy or Laparotomy.—The operation of gastrotomy should be performed in cases of rupture of the uterus. It is an operation of *urgency* for which every accoucheur should be prepared. Lusk says: "If the head have passed through the rent, if the os be dilated, and the feet be felt near the pelvic brim, the withdrawal of the child by version is usually effected without difficulty. If, however, the cervix be rigid, or if the rent be so large that a portion of the child has passed into the peritoneal cavity, or if its withdrawal be liable to increase the size of the laceration, it is doubtless better to incise the abdomen at the linea alba and deliver through the artificial opening." Indeed, it is a question whether it be not wise to perform gastrotomy in all cases of complete rupture, even when delivery by the natural passages has been accomplished, provided the rent does not close with the contractions of the emptied uterus. As complete rupture is almost inevitably followed by the intra-peritoneal effusion of blood, the patient's condition is thereby rendered extremely desperate. Gastrotomy, in such cases, enables the operator to cleanse the abdominal cavity, and if necessary to introduce sutures as a means of preventing further bleeding from the uterine wound.

The results of gastrotomies performed for the removal

of the child after its escape into the abdomen are extremely encouraging, Trask's statistics showing 76 per cent. of recoveries, those of Jolly 69 per cent., and the United States statistics, collected with indefatigable zeal by Harris, $53\frac{1}{2}$ per cent. If the bleeding from the uterus cannot otherwise be arrested, a Porro operation should immediately be performed, and the cavity of the abdomen thoroughly cleansed with aseptic sponges and hot aseptic douches, using a gallon or more of hot sterilized water, the heat of which greatly tends to prevent shock.

CHAPTER VII.

SYMPHYSEOTOMY.

SYMPHYSEOTOMY is a section of the pubic symphysis with the object of producing a separation between the iliac bones, thus increasing the dimensions of a pelvis too narrow for the passage of a child at full term.

Anatomy of the Symphysis Pubis.—The reader should be reminded in a few words of the anatomy of the articulations of the pubic bones, in order to understand the rationale of this operation. According to Quain, the "pubic articulation (symphysis pubis; Figs. 47, 48) is formed by the conjunction of the pubic bones in the median line anteriorly, being effected by an elongated piece of fibro-cartilage interposed between their surfaces and connecting them to each other. It consists of concentric lamellæ, is thicker anteriorly than posteriorly, and frequently projects beyond the level of the bones in the latter direction. Each pubic bone

has its own plate of fibro-cartilage. These plates are connected by fibres passing transversely from one to

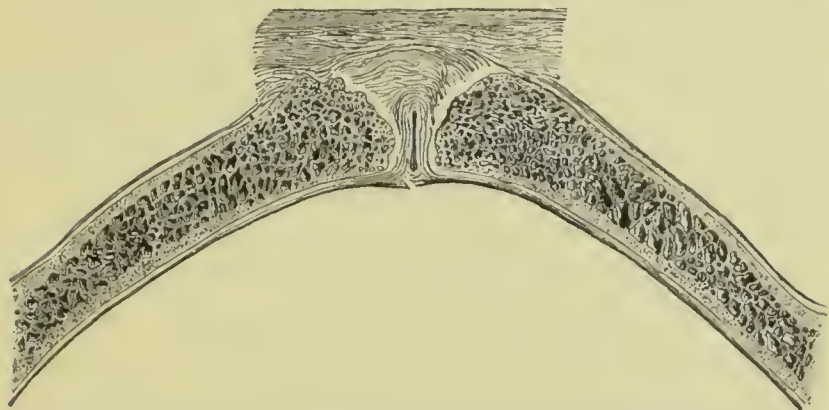


FIG. 47.—Section across symphysis pubis, showing interpubic disk (Lusk).

the other at the fore part, as well as at the upper and lower border. The union between the bones is strengthened, first, by an *anterior pubic ligament* which consists of irregular fibres passing obliquely across from one bone to the other, and decussating on the anterior surface of the fibro-cartilage; the fibres are intermixed with those of the aponeuroses of the pyramidalis and external oblique muscles of the abdomen; second, by the *subpubic ligament* (ligamentum triangulare arcuatum), thick and triangular, which is placed beneath the symphysis, its sides being attached to the rami of the pubis, its base free and slightly concave, directed downward and backward to

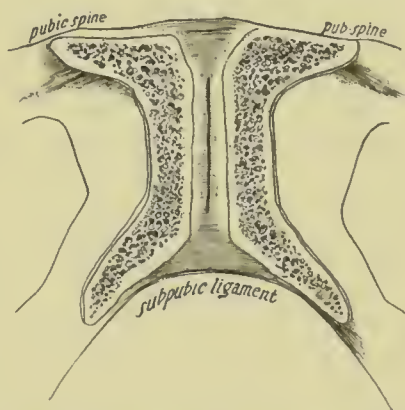


FIG. 48.—Vertical section through symphysis pubis, exposing interpubic cleft (Farabeuf).

the perineal space ; third, by some indistinct fibres which are situated on the posterior surface of the articulation, and others placed on its upper border."

The articulations of the pelvis become softened and relaxed during gestation on account of the secretion from the synovial membranes lining their surfaces, and symphyseotomy is thereby greatly facilitated.

The pubic bones have even been seen in some rare instances widely separated after a severe labor or a difficult forceps operation, and this separation on post-mortem sections has been found to amount to $2\frac{1}{4}$ inches. This separation during labor had been observed by the ancients (Hippocrates) and by many modern writers ; it takes place in women from eighteen to thirty-five years old, as stated by Lenoir and Duncan.

History.—The knowledge of these facts probably inspired the inventive genius of Sigault with the idea of dividing the pubic symphysis in the living in order to produce its separation, thereby enlarging faulty diameters of the pelvis, so as to allow of the passage of a living child, otherwise rendered impossible.

Jean René Sigault, then a medical student, imbued with this idea, began to investigate its feasibility, which he did by examining the pelves of several women who had died in labor. In 1777 he performed symphyseotomy for the first time on a living woman. She had an antero-posterior diameter of $2\frac{1}{2}$ inches and also an asymmetrical pelvis. The mother and child survived. This success created widespread excitement among the accoucheurs of Europe, and the operator was rewarded with great praises and honors by the Faculty of Medicine of Paris. But, unfortunately, succeeding cases were not followed by favorable results, and the operation was

soon severely condemned. In the next hundred years it almost entirely ceased of performance.

Mortality.—From 1777 to 1858, 86 operations were reported, giving a mortality of 33.72 per cent. of the mothers and 60.5 per cent. of the children. Churchill reports 78 cases before 1858, with 26 deaths of the mother. In 1866 there was a marked revival of the operation, which was performed by Professors Morisani and Novi of Naples 76 times (from 1866 to 1888), with a mortality to the women of 23.6 per cent. and an infant mortality of 22.4 per cent. These results were not encouraging, because the maternal mortality was greater than that shown by the statistics of the Cesarean section or that of embryotomy or of the high application of the forceps or of version. But the statistics of Morisani this year show a maternal mortality of only 3.5 per cent. and an infant mortality of only 5.5 per cent. in 55 operations. A better result has been shown by a pupil of Morisani, Dr. Spinelli, who from 1890 to 1893 saved 24 women and 20 children out of 24 cases. A still better result has been obtained by Prof. Pinard of Paris, who in 1892 and 1893 saved 27 women and 25 children out of 28 cases, the woman that died having been brought to the hospital infected with septicemia caused through many touches practised by an unclean midwife. Zweifel, a German, operated 14 times, with 14 maternal recoveries and 12 living children.

Garrigues says that the operation has been performed 26 times in the United States, with a mortality of 15.39 per cent. of the mothers and of 30.77 per cent. of the children, this inferior result being possibly due to a comparative neglect of that very strict antisepsis so carefully observed in Germany, France, and Italy, where such

brilliant successes have been reported within the last two years. However, a marked improvement has taken place in America, where Prof. Barton C. Hirst has lately successfully performed symphyseotomy under very difficult circumstances in 3 cases, saving the mother and infants. Broomall and Noble of Philadelphia, Michael of Baltimore, Springle of Montreal, M. Kennan of Paris, Ill., Duff of Pittsburg, Lusk, Coe, and Grandin of New York, and several others have performed the operation and saved a good proportion of women and children. Prof. Garrigues of New York performed it once with success, and Prof. D. Longaker three times, Jewett of Brooklyn being the first to perform it. Since 1892 the operation has been performed nearly two hundred times in Europe and America, several times twice on the same women. Rosenberg reports 37 cases of repeated symphyseotomy including 5 operations on one woman and 3 on another.

Prof. Karl Sandberg of Chicago, in an excellent résumé of the subject, expresses his conviction—which is also that of modern advanced obstetricians—"that symphyseotomy is naturally destined to assume a position between high-forceps delivery above the superior strait, version in much-contracted pelves, and Cesarean section under certain circumstances, and that it is a direct competitor with craniotomy."

Limitations of Symphysiotomy.—The minimum limit for the operation, according to Morisani, Zweifel, and Leopold, is a conjugate diameter of only 2 inches—the writer would say, with Professor Farabeuf, $2\frac{1}{2}$ inches. The increase to be depended upon in the true conjugate, after a $2\frac{3}{8}$ -inch separation of the pubic bones, amounts to a little less than 1 inch. This gives nearly $3\frac{1}{2}$ inches,

reckoning the original conjugate at $2\frac{1}{2}$ inches. This with the help of slow moulding will permit the passage of a small child at term. Harris places the minimum conjugate permitting symphyseotomy at $2\frac{5}{8}$ inches. Garrigues says that "the upper limit for symphyseotomy ought, in a flat pelvis, to be placed at a true conjugate of $3\frac{1}{2}$ inches, above which forceps or version offers the proper means of delivery; and if the pelvis is generally contracted, the limit must be extended to 4 inches." Before resorting to the operation accurate pelvimetry should be made. This is an important procedure, although sometimes unsatisfactory until it has been learned by frequent practice in every case of labor. Unfortunately, pelvimetry is not sufficiently taught in medical schools.

Indications.—Therefore, with a true conjugate of $2\frac{1}{2}$ to 3 inches, symphyseotomy or the induction of premature labor is indicated. With the same diameter measuring from 3 to $3\frac{3}{4}$ inches, the forceps or version should be attempted; if these fail, symphyseotomy should be performed. It should be done after the induction of premature labor if the head cannot be born. Under $2\frac{1}{2}$ inches Cesarean section is absolutely indicated if the child be living; if dead, craniotomy. Symphyseotomy should never be performed for a dead child. The principal indications will therefore be—a narrow, flat, or generally-contracted pelvis; some faulty presentation or position of the child's head, such as an occipito-posterior position or face presentation with the chin posterior and impacted, rotation having failed (Michael); obstructive tumors of the pelvis. In the impacted chin-posterior position Prof. J. M. Scott of St. Louis advises in preference the Cesarean operation if the child be liv-

ing, and if not living craniotomy. Should the child present by the breech or the shoulders in a moderately contracted pelvis, the operation should be performed as above, on account of the difficulty that will be presented by the head coming last. A necessary condition for symphyseotomy is a dilated or dilatable cervix.

Effects of the Operation.—Zweifel says that when the head passes through the narrow part of the pelvis the pubic bones separate from 6 to 7 centimeters ($2\frac{3}{8}$ to $2\frac{3}{4}$ inches). According to Garrigues, the distance between the middle of the promontory and the end of the pubic bones increases 14 millimeters, and, the presenting part entering into the gap between the divided bones, a further 6 to 8 millimeters is gained, making in all 20 to 22 millimeters ($\frac{3}{4}$ to $\frac{7}{8}$ inch). There is also an increased vertical mobility, described by Duncan, and the superior pelvic ring sinks down, thus helping to make the conjugate longer.

*Measurements by Professors Pinard and Farabeuf.*¹—At the end of 1891, Dr. Spinelli, an assistant to Prof. Morisani, reported 24 cases of symphyseotomy without the death of a single woman. He came to Paris and presented his results to Pinard. It was for Pinard a true revelation, and, with the assistance of Prof. Farabeuf and Dr. Varnier, he studied the operation upon the cadaver, ascertained exactly the enlargement obtained by this or that widening of pelves of different dimensions, established the technique of the operation, and solemnly declared in a lecture delivered December 7, 1893, that in future he would no longer craniotomize

¹ Condensed from an article by Dr. Wallich in *Journal de Médecine*, September, 1893.

a living child. In February, 1892, he performed a symphyseotomy for the first time in France since its former abandonment.

Prof. Farabeuf announced in a communication in the *Annales de Gynécologie* (Paris, December, 1892) that as a result of a thorough examination of the pubic symphysis he had come to the conclusion that by incising the symphysis directly in front from above downward there is no danger of wounding the internal organs, the clitoris, the urethra, etc., and that the bladder can easily be protected by a finger introduced behind the symphysis. He proves that by separating the iliac bones, owing to the play of the sacro-iliac articulation, the dimensions of the pelvis are increased. The antero-posterior diameter of the superior strait, for example, being $3\frac{1}{8}$ inches

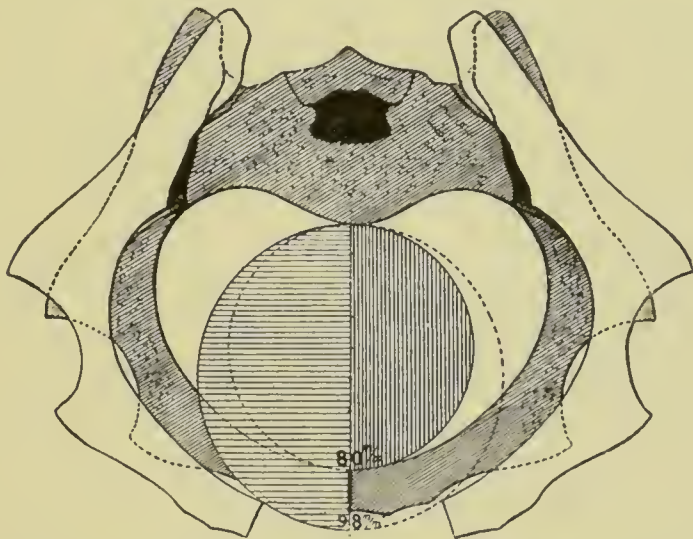


FIG. 49.—Diagram of pelvic brim, showing gain of space on separation of symphysis. Pubic joint closed, pelvic cavity admits a sphere 80 mm. in diameter; joint opened 6 cm., the cavity admits a sphere 98 mm. in diameter (after Farabeuf).

(8 centimeters) before the separation of the iliac bones, measures $3\frac{7}{8}$ inches (98 millimeters) after a separation

of $2\frac{3}{8}$ inches (6 centimeters) has been produced between the pubic bones (Fig. 49).

As a result of his experiments Prof. Farabeuf concludes that "the lengthening of the antero-posterior diameter is not uniformly proportionate to the widening of the separated pubis; this lengthening becomes accelerated according to a geometrical progression for every centimeter added to the pubic separation. For instance, if a pubic separation of 3 centimeters ($1\frac{3}{16}$ inch) lengthens the practical antero-posterior diameter by 8 millimeters, a widening of 3 more centimeters lengthens it by 12 millimeters additional, and not by 8 millimeters. This increase is accelerated in proportion as the pelvis is smaller."

The Operation.—There are two methods of operation—the *subcutaneous* or *Italian method*, and the *open method*, the latter being the one generally adopted.

Subcutaneous Method.—Incision in the median line 3 centimeters ($1\frac{1}{8}$ inch) long extending to a point 1 to 2 centimeters ($\frac{3}{8}$ to $\frac{3}{4}$ inch) above the symphysis. Small transverse incisions are made to detach the muscoli pyramidales. The left index finger is then introduced behind the symphysis pubis and down to its lower end, and a Galbiati falcetta (Fig. 49, A) or a strong concave, probe-pointed bistoury (Fig. 49, B) is slid down on the finger until its probe-pointed end can be felt under the pubic arch; the symphysis is next divided from below upward and from within outward.

The centre of the symphysis can be ascertained by finding the spines of the pubic bones. The cartilage is generally prominent. The joint is not always in the median line, but frequently is to one side, the displacement in the large majority of cases being to the left.

Its direction is often oblique, most commonly from the right side to the left.

The subcutaneous method is simple and gives rise to less hemorrhage than the open method; the wound can be kept perfectly aseptic, and the hemorrhage can be controlled by tampons. This method is preferred by Prof. Sandberg, and it has given most brilliant results in the hands of Morisani.

The open method is adopted by Pinard and by a great many operators in Europe and America, because it allows a full view of the field of operation, and enables the operator to find the best place for dividing the symphysis; it also enables him to see the bleeding points and to ligature, suture, or clamp them. But the wound extending to the vulvar orifice is exposed to the lochial discharge and urine, and is very difficult to keep aseptic (Sandberg). It is claimed by some that packing is the only reliable hemostatic for the sometimes profuse hemorrhage caused by this method.

Pinard's Latest Method of Operating.—This is purely the *open method*, as will be seen. The woman is placed across the bed in the dorsal decubitus; the thighs are abducted and flexed upon the pelvis by two assistants. The pubic region is washed with soap and water, then with ether, and finally with a 1 : 2000 solution of bichlorid of mercury. The adjacent parts—groins, vulva, and anus, as well as the lower part of the abdomen—are also carefully washed. Afterward the bladder is emptied with a catheter and an antiseptic injection thrown into the vagina. The operation comprises three stages:

1. Incision of the integuments.
2. Incision of the symphysis and of the subpubic ligament.

3. Separation of the iliac bones.

1. *Incision of the Integuments.*—The length of the incision cannot be fixed in advance, as the height of the symphysis varies with every individual. The incision must be vertical and median, between the pubic spines, beginning on a level with and a little above the superior border of the symphysis and descending to its inferior border. The incision should deviate a little in the neighborhood of the clitoris without encroaching on the superior part of the vulva. Thus the integuments are incised down to the cartilage without stopping to twist the small bleeding arteries. The fibro-cartilage on a level with the anterior face and the superior border of the symphysis is freed with the scissors on the finger as a guide; then two small incisions are made transversely, starting from the median line, and just touching the superior border of the symphysis, so as to cut the aponeurotic tissues, in order to make room for the introduction of the index finger along the posterior face of the symphysis. This finger easily feels the prominence of the fibro-cartilage, and thus effectually protects the organs posterior to the symphysis. Then begins the second stage.

2. *Section of the Symphysis.*—A straight bistoury directed to the bottom of the wound can reach only the bone, which resists, or the cartilage, which is easily cut from before backward and from above downward. After beginning the section with a straight bistoury, a probe-pointed bistoury or a Galbati knife (Fig. 50) is to be substituted. At the moment of making the section of the subpubic ligament an assistant places a metallic catheter or sound in the bladder and draws down the urethra, and the section is continued slowly, prudently, and by short strokes so long as the instrument is heard

to creak. Little by little, the resistance gives way, and at once, with a slight jerk, the iliac bones yield and the pubic symphysis is severed in its whole length. Then the third stage must be proceeded with.

3. *Separation of the Iliac Bones.*—The assistants by a movement of abduction of the thighs, performed slowly

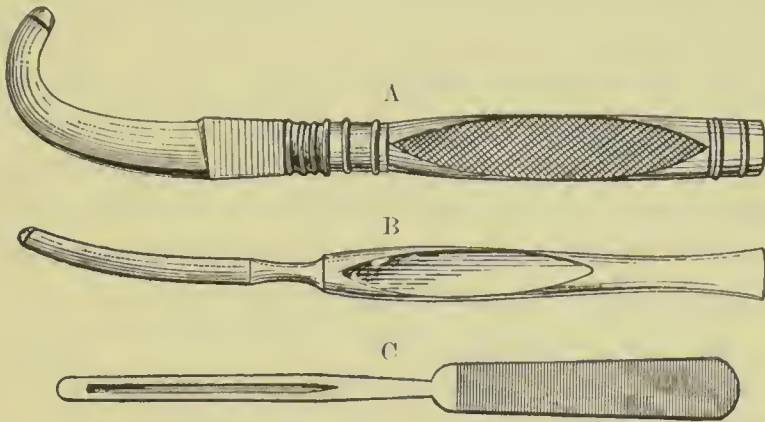


FIG. 50.—A, Galbiati knife; B, bistoury; C, Hay's director.

and progressively, produce this separation. The surfaces of section of the symphysis separate from each other to the extent of enabling one, two, or three fingers to be placed between them. We know that, without danger to the sacro-iliac articulations, the separation may be produced to the extent of $2\frac{3}{4}$ inches (7 centimeters). When the widening is judged sufficient the assistants should neither increase nor diminish the space without the order of the operator. The wound is tamponed either with a sponge, antiseptic cotton, or iodoform gauze. Then the child is extracted.

Extraction of the Child.—In case of delay in the birth of the child, the forceps are applied according to the classical rules, the blades being placed on the parieto-malar regions of the flexed head. Traction is made;

the head descends easily until it reaches the perineum. No force should be used: if there be some resistance, the separation of the pubis should be increased within safe limits.

As the head has descended transversely into the excavation, it must be made to rotate, so that it can easily go through the inferior osseous and muscular straits.

Dr. Varnier calls attention to a cause of frequent laceration of the anterior region of the vagina. He says: "When the iliac bones are separated the vulva and soft parts no longer present a longitudinal orifice extending from above downward and from before backward. The orifice is now drawn transversely, while its superior border is no longer supported by the osseous parts. Therefore, the head, which has just been made to rotate, will present its greatest diameters at right angles to the now transverse vulva.

"If traction is made, the soft parts yield where they are unsupported, between the ends of the separated pubic bones; hence the lacerations in the anterior region of the vagina."

Winckel¹ says the laceration is due to the longitudinal stretching of the vagina during the extraction of the head. Dr. Varnier proposes a method of the utmost simplicity to avoid these injuries: When the child's head has perfected its rotation the assistants must bring the patient's thighs together; the separation between the iliac bones disappears, and with it the transversal drawing of the vulvar orifice, which is restored to its normal longitudinal appearance, and the head traverses the osseous, the inferior and muscular straits, and the vulvar orifice as in a normal labor, without causing injury.

¹ Breslau Congress, 1893.

The operation having now been terminated in its essential parts, the umbilical cord is tied, clamped, or cut, and the infant given to a nurse. A vaginal injection is given, the placenta removed, an intra-uterine injection follows; then a large wick of iodoform gauze is placed in the vagina as a tent. The tampon placed in the wound is removed, the surface of the wound is touched with a 5 per cent. solution of carbolic acid or 1:2000 of biniodid of mercury. The assistants bring together the iliac bones by pressing on the hips. The suture of the integuments is made with three deep and three superficial sutures of silk or of silver wire. The wound is covered with iodoform gauze and antiseptic cotton. Around the hips is placed a very tight bandage and a T-bandage.

The dressings over the wound must be renewed twice a day, changing the iodoform gauze, which becomes soiled inferiorly. The patient should be washed after each micturition. The iodoform-wick placed in the vagina may be left in two or three days; it secures the antisepsis of the vagina and dispenses with injections during this first period. Injections are difficult to give without disturbing the bandage around the hips.

About the eighth day the wound is cicatrized. An edema of the pubis or of the vulva sometimes takes place, but is of no consequence. The temperature and pulse are the same as in ordinary labors. Zweifel noticed moderate fever in some of his cases, their recovery, however, having eventually been satisfactory. The diet should be that of all parturients. Sometimes on the first or second day the patient presents some tympanites, which readily yields to an enema composed of a glass of wine and two tablespoonfuls of glycerin.

Opiates should be avoided during the first days, as they give rise to tympanites. Toward the tenth day the woman may be allowed to move about in her bed, and may get up on the twenty-fifth day without experiencing any suffering in her symphysis or sacro-iliac articulations. All the women thus operated on were able to nurse their children.

It was by following the above technique that Professor Pinard was able to present to the Obstetrical Society of France (in April, 1893) the following results of 19 symphyseotomies (he has had since then, up to the end of 1893, 20 other equally successful operations). Of the first 19 patients operated on, all the women and 16 of the children were saved. Of the three children lost, 2 died from injuries caused by a previous application of the forceps. Sixteen of these women had previously had, in the aggregate, thirty parturitions, which were terminated according to the methods employed before symphyseotomy was practised—namely, by induction of premature labor, forceps, version, or basiotripsy.

In symphyseotomy, as in every operation, there are certain difficulties to which attention should be called:

1. There may be some delay in finding the fibrocartilage of the symphysis if the bistoury does not impinge on the median line. This difficulty can be obviated by searching for the cartilage on the superior border of the symphysis, between the spines of the pubis, and not on its anterior face. It should be remembered that occasionally the symphysis is not in the median line, but to one side, generally to the left. For instance, if the patient has an oval-oblique pelvis, where one ramus projects in advance of the other, the symphysis of the pubis is not in the median line, but is to be found to one

side. Pubiotomy should then be performed by separating with a chain-saw the advancing pubic ramus, thus obtaining sufficient room for the passage of the child. Pinard has lately performed pubiotomy under the above circumstances.

2. Certain German authors (Leopold, etc.) teach that only an incomplete section of the symphysis should be practised; that is, that the subpubic ligament should not be cut; as a consequence, the widening between the iliac bones is nil or insufficient. The same result may arise from timidity on the part of the operator. The symphysis must be cut through its entire height in order to obtain sufficient space between the pubic bones. During the section of the inferior parts the urethra, drawn down by a metallic catheter, runs no risk of being wounded. During this section there is sometimes produced a diffused hemorrhage, which Pinard has always been able to control with a tampon and compression of the anterior part of the vagina.

3. Before the extraction of the child a certain widening between the iliac bones must be produced by abduction of the thighs, in order to allow the head to dilate the pelvis, otherwise there would result a traumatism of the head of the child. When this previously-intended and well-calculated widening is obtained the assistants who hold the thighs must not move; they must not decrease nor increase this widening without an order from the operator.

4. The child's head must be seized by a regular application of the forceps, the blades being accurately applied to the parieto-malar regions of the head, which must be flexed. If the forceps be not properly applied, the head may present too long a diameter to the pelvis,

and may be fractured if the assistants do not maintain a sufficient widening between the iliac bones.

5. The head having descended into the excavation, and its movement of rotation being accomplished, before making the extraction through the inferior osseous and muscular straits the advice of Varnier must be followed, and the pubic bones, whose separation is no longer useful, brought together; the vagina, as stated above, is no longer drawn transversely, and the iliac bones resume their agency in supporting the soft parts, which will not then be lacerated. In order to perform symphyseotomy successfully one must have practised it on the cadaver.

In operating, one assistant is required to give chloroform, two assistants to hold the patient's legs. The latter assistants, being passive, need not be skilled, provided they be closely watched. As for the operating material, it is possible to improvise it in case of urgency. Anti-septic substances should be within the reach of any one who practises medicine in our day. The instruments needed are a straight and a probe-pointed bistoury of large size or a Galbiati knife, artery-forceps, a metallic catheter or sound, needles, and silk or silver ligatures; all these instruments, except the Galbiati knife, are to be found in every surgical pocket-case; stout cloths or plaster of Paris for a fixed dressing can easily be procured.

"Be certain of this fact," said Pinard in one of his lectures—"that it is easier to open a pelvis than to open a trachea or to operate a strangulated hernia—operations that every physician ought to be able to do.

"Study symphyseotomy. The technique which I have described seems to me the simplest and easiest of execution. Operate in this manner, and you will have no complications.

"Symphyseotomy may, however, present two complications to be avoided :

" 1. The previous infection of the mother.

" 2. The previous injuries to the child by a premature use of the forceps or version.

" Avoid the one, do not produce the other, and I predict success in your operations."

Dangers of Symphysiotomy.—Injuries to the soft parts, urethra, vagina, bladder, etc., have occurred and still occur in a number of cases, and prove to be serious complications. It is probably more reasonable to attribute these injuries to the stretching of the parts between the separated bones than to any injury from the forceps or the fetus (Karl Sandberg). The bladder may be caught in approximating the pubic bones after the operation if care be not taken to push it back in closing the wound. To avoid the injuries due to tension it is advisable in forceps extractions to pull well back, and rather to risk a tear of the perineum or to perform episiotomy than to expose the inner organs in front (Garrigues).

After separation of the pubic bones the soft parts are much distended and stretched transversely, having lost the bony support necessary for their integrity. The lesions of the anterior parts of the vulva are rendered less intense by very slowly separating the thighs and iliac crests before the head has descended. An enlargement of the pubic symphysis amounting to $2\frac{3}{8}$ inches is the safe limit ; more than this is unsafe and is useless ; the above enlargement will lengthen a conjugate of $2\frac{1}{2}$ inches sufficiently for the passage of a child. Zweifel recommends that the patient's legs be spread as little as possible. "Await spontaneous delivery" is the advice of Morisani, who uses the forceps in only one-fourth of

his cases, while Garrigues and Pinard favor its use in almost every case. The injuries should immediately be repaired with silk ligatures. The vesico-vaginal fistula heals, as a rule, spontaneously. As to injuries to the sacro-iliac joints, they are seldom so serious as to cause permanent lameness. A proper tight bandaging will prevent the mischief.

Sources of bleeding and contusions are the sharp ends of the separated pubic bones lacerating the urethra, the clitoris, or the venous plexus of the vestibule, especially during rapid extraction of the head before the parts have been sufficiently prepared. In support of this statement, Budin (1893) reports having observed at the birth of the child two vertical red lines on the anterior parietal bones. To obviate the accidents just mentioned it has been recommended to perform perineal section or episiotomy. It is recommended that this section be made obliquely and deeply, so as to include the transversus perinei muscle on each side, in order to facilitate the distention of the perineum.

Putting aside the remote dangers of the operation, such as the incomplete union of the symphysis or supuration of the wound, *hemorrhage*, says Porak, is the great danger to be feared, especially after the open method, when the bleeding is not so easily controlled. When hemorrhage takes place, it is generally arrested by firmly stuffing the parts with iodoform gauze and, if necessary, putting in a few stitches of silver-wire or silk ligatures (*crins de Florence*).

Prognosis.—Varnier has in 124 modern operations found a maternal mortality of 9 per cent., but in a large proportion of fatal cases death was not attributable to the operation alone. With some operators the progno-

sis is far better, as shown by the results obtained by Garrigues, Pinard, Zweifel, and lately by Morisani and by Spinelli his assistant. Properly performed and within proper limits, Garrigues, Pinard, Zweifel, Morisani, Sandberg, and all the modern operators think the prognosis for the mother is very good.

But for the children the prognosis is not so favorable. Varnier's statistics show an infant mortality of 22.7 per cent. from asphyxia, fractured cranium, etc. This great mortality is often due to attempts at forceps or version before symphyseotomy. Moreover, the operation, usually so simple, is occasionally difficult and complicated and may require craniotomy at last if the child be dead, or the Cesarean operation if the child be living.

"Craniotomy on a living child should never be performed, since we possess less destructive means at command" (Garrigues). "Embryotomy has ceased to be a justifiable procedure on a living child" (Thomas D. Dunn).

Pinard prefers symphyseotomy to the *induction of premature labor* for the sake of the children, whose mortality in the latter operation, according to his statistics, is 43 per cent. (an exaggerated statement), while the maternal and infant mortality are each only 5 per cent. in symphyseotomy. But as the induction of premature labor is a much easier operation and can be performed by almost any one, it should always be first attempted, even if it subsequently be necessary to perform symphyseotomy on account of the very large size of the child's head. If the head be of an unusual size, symphyseotomy would be indicated even with a normal pelvis (Garrigues).

Symphyseotomy, when there is a relative indication,

should be preferred to Cesarean section or to the forceps above the superior strait after version has failed, as being less formidable and as more favorable to the mother and child. In 114 applications of the forceps at the superior strait by Pinard before he adopted symphyseotomy, 35 children were born dead or wounded, and in 234 cases of version for contracted pelvis in the practice of Leopold in Dresden and in that of Braun in Vienna the mortality was 32.1 per cent.

When there is an *absolute* indication Cesarean section becomes the only alternative if the child be living; if dead, craniotomy should be performed, as above stated. This *absolute* indication for the Cesarean operation is a conjugate below $2\frac{1}{2}$ inches.

We must conclude by saying that a return to symphyseotomy is a marked progress, but this progress is due in a great measure to the observance of strict antisepsis. Garrigues says that symphyseotomy is a valuable addition to obstetrical resources. It ought to be performed frequently in maternities and in private specialist practice, and should be preceded by accurate pelvimetry.

There is now a symphyseotomy wave spreading over the medical world, and the danger is that it may carry us too far, and make us forget that it is a dangerous operation, and is not to be performed without surgical skill and experience. It is a more difficult operation than Cesarean section, on account of its complications and accidents, and it will not soon become popular, its legitimacy and technique being still under discussion. Owing to the energetic impulse given it by Professor Pinard and his followers, the question of the performance of this operation is now of immediate moment and paramount to all others in medical research. Whatever may

be the pronounced judgment on symphyseotomy, this operation occupies an important part in the practice of obstetrics, whether, according to Pinard, this operation is to be exclusively adopted in contracted pelves, or whether, according to Budin, it should be reserved for exceptional cases.

CHAPTER VIII.

EMBRYOTOMY AND DECAPITATION.

IT must be admitted that with our modern obstetric operations and the perfection of old methods the destruction of a living child is never called for. Many eminent and advanced obstetricians now hold this opinion. Stoltz, the celebrated professor of Strasburg, could never, as stated before, make up his mind to destroy an unborn child. Pinard of Paris in a late lecture formally proclaimed that in the future he would not have recourse to any measures destructive of a living child. The names of many obstetricians could be cited who have reached the same decision. Therefore, any man who, in the light of recent researches, deliberately sacrifices an unborn child, simply confesses his ignorance of the progress of obstetrics and places himself behind the age.

In accordance with this view, the first indication for performing mutilating operations is that the child be dead beyond any doubt.

I. EMBRYOTOMY.

There are included under this generic term a variety of admitted measures. The operation on the cranium,

perforating the bones and evacuating the cerebral matter, is called "craniotomy." But it may happen that this operation is insufficient, because the irreducibility of the diameters of the cranium may persist; then a second operation becomes necessary in order to reduce the diameters of the skull by crushing its vault and its base, which operation is called "cephalotripsy" or "spherotripsy" (basiotripsy). The operation on the trunk is called "rachiotomy" by the French or "spondylotomy" by Simpson.

Evisceration or *exenteration* is another operation, which means the opening of one of the large cavities of the trunk and the removal of the contained viscera.

Craniotomy.—This is a very old operation, being known to the Greeks and the Arabians. It is necessarily fatal to the child. The ancient obstetricians used all kinds of instruments. At the present day we employ perfo-



FIG. 51.—Perforator of Smellie.

rating scissors, among which those of the guarded kind of Smellie (Fig. 51) and those of Blot are considered the best. T. G. Thomas's perforator can also be strongly recommended.

Technique.—The woman should be placed on her back and the ordinary precautions observed, as in forceps applications. Some obstetricians have advised penetrating one of the sutures with the perforator. It will certainly be an easier operation, but the hand cannot feel when and how far one has penetrated, and if we enter too deeply we might perforate the sacro-vertebral angle.

The cerebral matter in some instances may be prevented from escaping by the riding over of the cranial bones.

The *place of election* is on a level with one of the parietal bosses, a little in front or a little behind. Two fingers of the left hand must be introduced far enough to reach the fetal parts; then the handles should be lowered and the instrument pushed straight up. Having struck the bone, give to the instrument a gimlet-like movement. Instruct an assistant to press with all his might against the fetal chin and occiput, because the head recedes easily before the pressure of the instrument; it will then be felt that the instrument has pierced the bone and that the resistance has been overcome. Now the two branches of the perforator should be pressed apart to facilitate the escape of the cerebral matter. The instrument should be withdrawn on the left hand, which thus far has been acting as a guide.

As soon as the instrument penetrates the scalp a great quantity of blood will issue. Be not alarmed; the caput succedaneum is the source of this hemorrhage. If this blood be of a dark *venous* character, a dead child has been perforated; if the blood be *arterial*, a living child has been sacrificed through a deplorable error in diagnosis.

When the brain and cerebellum have been destroyed the heart may still continue to beat for half an hour or longer. In a case of craniotomy performed in Louisiana the child cried so lustily for two hours that it had to be removed to the negro quarters to spare the mother the agonizing cries of her child. Craniotomy in this instance was as useless as it was sanguinary, for the mother has since had three living children born after normal labors.

Craniotomy in Presentation of the Face.—Failing to penetrate the orbits, the operation should be terminated through the palate. This is a very difficult procedure.

Craniotomy in Presentation of the Pelvic Extremity.—This operation is easier than the preceding, because one will have as a guide the vertebral column, and can, by having an assistant pull on the body, render the head immobile. Penetrate through the occipital bone.

Extraction of the Child after Craniotomy.—Tarnier recommends the use of the forceps for extracting the head after craniotomy. By pressing the handles of the instrument forcibly together there is effected sufficient evacuation of the cerebral contents to secure a marked flattening of the cranial vault and to render cephalotripsy unnecessary.

Cephalotripsy.—This operation is performed by the *cephalotribe* (Fig. 52), presented first to the profession

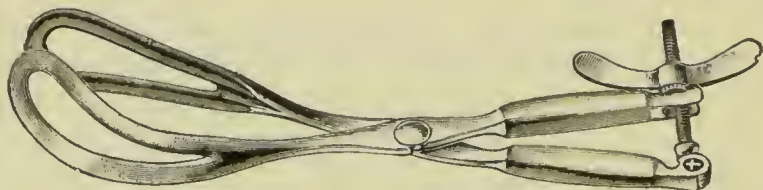


FIG. 52.—Cephalotribe of Lusk.

in 1827 by Baudelocque, *neveu*. The original cephalotribe was immense, 2 feet long and weighing seven pounds. This instrument was shown to Simpson while on one of his visits to Paris, and he exclaimed, in his broad Scottish accent, "Is this for a coo?" (cow). Since then the instrument has undergone modifications, especially as to the form of its blades. The cephalotribe acts essentially as a crusher, but is also a tractor; it resembles, after all, a strong forceps, generally with solid

blades, as in the instruments of Blot and Scanzoni, or in some cases with fenestrated blades, as in those of Lusk (Fig. 51) and Bailly, the last two being the best. They have a cephalic curve of $2\frac{1}{4}$ inches and a pelvic curve of 3 inches and 2 lines. To the handles is attached a thumb-screw, designed to approximate the blades until their ends meet, thus crushing the cranium. The instrument is applied to the head before it becomes fixed at the brim. The limit for its safe employment, as a rule, is reached at $1\frac{3}{4}$ inches in the conjugate. It is claimed by Pajot and Barnes that cephalotripsy can be accomplished under this diameter, but most severe injuries to the maternal tissues may then be inflicted by the instrument, especially in the higher degrees of the pelvic deformity. Fifty per cent. of the women are reported to have died after the operation. It is proved that with the higher degrees of pelvic contraction the Cesarean section or symphyseotomy would be preferable, as either of these operations shows a much lower rate of mortality.

Instead of the cephalotribe, the English and the Germans use an instrument called the "cranioclast," first proposed by Simpson (Fig. 53). It somewhat resembles the

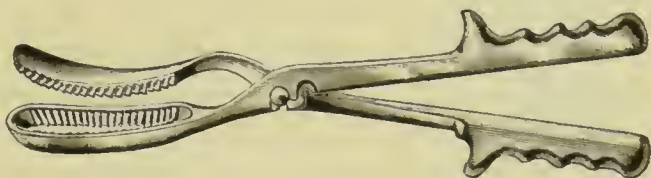


FIG. 53.—Cranioclast of Simpson.

mouth of a crocodile. It has two blades, right and left the right blade being fenestrated. Craniotomy having been performed, the left blade is introduced into the opening; the other blade is passed outside of the cra-

nium and the head is crushed all around. But the base of the cranium is not reached, because, the instrument not being long enough, the vault only is crushed. Braun's cranioclast is better. It is longer, and there has been added an apparatus for compression. It is a compromise between the French cephalotribe and Simpson's cranioclast. It is a good instrument.

Great care should be taken in extracting the crushed head, on account of the danger from pieces of crushed bones lacerating the maternal tissues or wounding the fingers of the operator. Some authors, mindful of the possibility of such accidents, have recommended large uterine injections of some antiseptic fluid as a guard against septicemia.

Evisceration or Exenteration.—This operation was first proposed in 1827 by Robert Lee. It must be preceded by *brachiotomy*, or amputation of the arms and scapulæ. The hand is next introduced into the thorax, an opening having previously been made by a bistoury. If there be not enough room, the operator cuts through the diaphragm, seizes the heart, liver, and lungs, and tears them off. Then with a blunt-hook he seizes the hip or the inferior extremity of the spine, and draws on the child, which is then born doubled up. Holler practises the same operation without amputating the arms. He makes the incision through the ribs and performs the evisceration through the opening thus made.

This is a difficult, exceptional, formidable, and very disgusting operation, and should be resorted to only when version is impossible on account of the trunk's presenting and being caught by a strongly contracted uterus. Decapitation, next to be mentioned, is much easier to perform and just as efficient.

2. DECAPITATION.

Decapitation is an operation to be resorted to in neglected cases of shoulder presentation in which version cannot safely be effected, owing to the shoulder being wedged in the pelvis and the uterus being firmly contracted upon the child.

We then have a choice between only two modes of delivery if the child be dead—evisceration or decapitation; if living, Cesarean section or symphyseotomy should be resorted to. Decapitation is a very ancient operation: it was described by Celsus, and since his day by many other writers. Sir James Y. Simpson considered decollation preferable to evisceration, being much easier for the practitioner, and far less dangerous to the mother.

Several instruments have been devised for performing decollation, such as Ramsbotham's decapitator, which is a blunt-hook with a cutting edge upon the inner border, and Braun's decollator (Fig. 54),

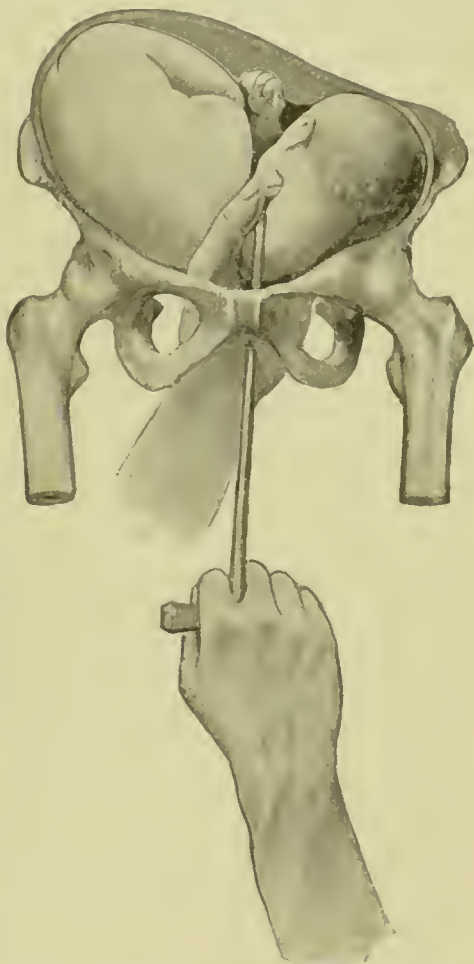


FIG. 54.—Decapitation with Braun's hook (Dickinson).

which breaks the child's neck. Dr. Kidd recommended attaching a string to an elastic catheter armed with a strong stylet; the instrument, being properly curved, is passed around the child's neck, and as it is withdrawn the string should be used to drag a strong cord or a chain écraseur into place, and the neck be severed by sawing. These are ingenious methods, but not always practical, on account of the difficulty in passing these instruments around the child's neck.

A much easier and more practical method is that suggested by Pajot. He has a groove made upon the convex border of a sharply-bent blunt-hook; in this groove is placed a long whip-cord to the end of which is attached a small strong ring. The blunt-hook is passed around the child's neck, the cord is loosened, and the ring, by its own weight, falls behind the child's neck. The ring is then caught by the hand of the operator. The hook is withdrawn, leaving the cord around the neck; by a quick sawing movement the neck and vertebral column are thoroughly divided. While sawing the string should be crossed or be placed in a speculum, as a protection to the maternal parts from the friction produced by the to-and-fro movement of the string.

Prof. Heyerdath of Berlin in 1855 anticipated Pajot's idea by constructing an instrument on the same principle, but not so practical. Pajot, it must be said in justice to him, was ignorant of the method of Prof. Heyerdath.

Pajot previously used a leaden bullet instead of the above-mentioned ring, as being much easier of introduction. It is incredible in what a short time (two minutes) he could divide the child's neck. Instead of the whip-cord, the bass string of a piano would do very well; it

acts as an *écraseur*, and is easily procured, as a piano is to be found in almost every house.

A safe and practical method is that suggested by the late Dr. Walter Coles of this city. It is as follows: The child's arm is drawn out in order to bring the head lower; the blunt-hook, which is to be found on most forceps, or any blunt-hook, is placed behind the neck, which should be drawn down and severed with a scalpel or a bistoury.

Dubois' large scissors are admirable for the purpose of severing the neck.

What is to be done with the head left in the uterus? This situation is sometimes embarrassing. Recourse must be had either to the hand alone, to the forceps, or to the cephalotribe, according to circumstances. The head may sometimes be delivered by introducing a blunt-hook into the child's mouth. If not successful, perform cephalotripsy, the head being immobilized by strong pressure over the pubis.

Embryotomy, or Cesarean Section?—The ancients entertained the belief that in difficult labors the unborn child was an unjust aggressor against the mother, and must therefore be sacrificed to save her life. Hippocrates, Celsus, Avicenna, and the Arabian School invented a number of vulnerating instruments to enter and crush the child's cranium. With the advance of the obstetric art more conservative measures were gradually adopted, such as the forceps, version, induction of premature labor, and, finally, Cesarean section. With these measures in view, the question now is—

Are we ever justified in killing an unborn child in order to save the mother's life?

This is an important question, and the sooner and

more satisfactorily it is settled the greater will be the peace of the medical mind and conscience. In answer to the question the writer replies *No*, and claims that under no conditions is it ever allowable to destroy the life of the child in order to increase the mother's chances of living. This is the only legitimate conclusion if we consider the subject from an ethical standpoint.¹

From a scientific and practical standpoint we deduce the same conclusion. Parvin says that the improved Cesarean section has given in Germany results so satisfactory that, possibly, the day is at hand when craniotomy upon the living fetus will be very rarely performed, if done at all. Kinkead, a high English authority, states: "To reduce the bulk of the child or to extract it afterward through a pelvis of $2\frac{1}{2}$ inches or less conjugate diameter is an operation of extreme difficulty, lengthy, requiring very great experience as far as the mother is concerned, demanding an amount of manual dexterity rarely to be acquired outside of a large city; while, on the other hand, the Cesarean section is an easy operation, capable of successful performance by any surgeon of ordinary skill."

Tait remarks that he "feels certain that the decision of the profession will be, before long, to give up the performance of such operations as are destructive to the child, in favor of an operation that saves it and subjects the mother to little more risk. The operation of Cesarean section, or the Porro amputation of the pregnant womb, will revolutionize the obstetric art, and in two years we shall hear no more of craniotomy, for the improved method will save more lives and is far easier of performance. It is the easiest operation in abdominal surgery, and every country practitioner ought to be able, and

¹ See author's monograph, *Cesarean Section or Craniotomy*.

always prepared, to do it." So said Lawson Tait in 1888.

Many other authorities could be quoted, showing the change in sentiment that is taking place among the profession upon this important question. It is established by the consensus of professional opinion that craniotomy has frequently been performed in cases where delivery could have safely been accomplished by the forceps, by turning, or even by the unaided power of nature (Busey); and there is no case known to Busey in which a woman on whom a section had successfully been performed has refused to submit to its repetition in subsequent pregnancies. In Belgium the Cesarean section has been performed seven times on the same woman, and in Philadelphia three times.

"The brutal epoch of craniotomy has certainly passed. The legitimate aspiration and tendency of science is to eliminate craniotomy on the living and viable child from obstetric practice" (Barnes, as quoted by Busey). Tyler Smith is in perfect accord with Barnes, who again writes: "For the Cesarean section two very powerful arguments may be advanced. First, that the child is not sacrificed. Second, that the mother has a reasonable prospect of being saved."

Late reports of the Dublin Rotunda Hospital show that in 3631 cases of labor craniotomy was performed only 4 times, and in 3 of these cases a positive diagnosis of the child's death was ascertained before the operation. In 1 of these cases the diagnosis was doubtful. Thos. More Madden, a celebrated obstetrician of forty years' experience, never performed the operation.

"The brilliant achievements in abdominal surgery give assurance that the Cesarean section is not only a legiti-

mate operation, but one almost free from danger; also, that the tragic scenes heretofore witnessed in certain cases, in which the destruction of the child was resorted to, may be relegated to history" (A. P. Clarke).

The Production of Abortion to Save the Mother's Life.—The principle, once admitted, that one is not justified in killing an innocent aggressor equally prohibits any interference with early gestation. From the moment of conception the child is living. It grows, and what grows has life. *Homo est qui homo futurus*, says an ancient and high authority. Therefore, feticide is not permissible at any stage of utero-gestation.

The killing of the defenceless fetus is sometimes done in cases of uncontrollable vomiting of pregnancy and in cases of tubal or abdominal gestation, the fetus being destroyed by electricity, injections of morphin into the amniotic sac, the puncturing of that sac, etc. This practice, which is too lightly adopted by thoughtless or conscienceless physicians, is much on the increase. The writer once heard an obstetrician of the old school say: "I would as lief kill, if necessary, an unborn child as a rat." So much for the estimate he put on the value of human life! *O, tempora! O, mores!* Is it not time that this wanton "slaughter of the innocents" should cease?

The latest statistics arrived at in the two operations of craniotomy and Cesarean section are here given.

In the combined reports of the clinics of Berlin, Halle, and Dresden the maternal mortality in craniotomy was 5.8 per cent.—of course 100 per cent. of the children were lost. In Cesarean section the maternal mortality was from 8 to 11 per cent.; children's mortality, 13 per cent. Caruso, the latest and most reliable statistician, not an optimist, sums up the results from the

different clinics, and comes to the conclusion that craniotomy shows that $93\frac{1}{100}$ mothers recover, Cesarean section, $89\frac{4}{100}$. Caruso therefore infers that craniotomy on the living child should be superseded by Cesarean section. He says that the mother has nine chances out of ten, and her child six out of seven, for life. Leopold, as stated above, shows a much better result—namely, 95 mothers saved out of 100 Cesarean sections, a result equal to that obtained by craniotomy.

PART III.—ACCIDENTS TO THE CHILD.

CHAPTER I.

PROLAPSE OF THE FUNIS.

Definition and Frequency.—Prolapse of the umbilical cord is an accident which, while of comparatively little danger to the life of the mother, is exceedingly hazardous to that of the child if permitted to remain uncorrected. This accident, without being frequent, is not particularly rare, and it always constitutes a very serious danger for the fetus, which may perish on account of the compression of its cord during labor. The cord may fall by the side of any of the presentations, but falls oftener in those of the breech and shoulders than in presentation of the head (Fig. 55). It also occasionally occurs in cases of placenta prævia.

As regards the *frequency* of the accident, statistics prove that it happens once in about every one hundred and fifty labors. It is called "presentation of the funis" when the cord descends to the uterine orifice before the rupture of the membranes; if the descent occurs after the evacuation of the waters, it is called "prolapsus of the cord;" but these are only degrees of the same accident; therefore the distinction is useless.

Causes.—Any anomaly which prevents the inferior segment of the uterus from applying itself exactly on

the fetal part produces a disposition to the falling of the cord, which is then deprived of its natural supports.



FIG. 55.—Umbilical cord caught in the axilla, encircling the shoulder, and prolapsed (Hunter).

Among the principal causes are—an excess of the amniotic fluid; the presence of twins; an artificial rup-

ture of the membranes at their centre, as when with a fully-dilated os the head is still above or at the brim. By this premature discharge the cord or a foot or a hand may be washed out, the extremities acting as guides for the cord. Another cause is the lateral position in labor, the posture selected in England, and the semi-erect position, as adopted in Germany, which positions favor the descent of the cord. The dorsal position, as practised in America, and, still better, with the hips elevated, as in France, show fewer fallings of the cord. To these causes may be added malpositions of the fetus, such as shoulder, arm, face, or breech presentations; a narrow pelvis; the position of the placenta near the os, hence a low insertion of the cord; and a very long cord.

Diagnosis.—In general the diagnosis is not difficult. Before the rupture of the membranes one can recognize by the touch the presence of a soft, movable body, similar to a loop of intestine, presenting in the interval between the pains rhythmical pulsations which unmistakably reveal its origin. The diagnosis is more difficult if the bag contains much water and remains always tense, or if there be present a small loop, beating very feebly. The cord of a dead fetus might be mistaken for fingers, toes, etc., but after the rupture of the membranes, when the physician's finger can directly feel the prolapsed cord, the diagnosis becomes easy.

It is important for the diagnosis of the life or death of the fetus to know that the beatings of the umbilical cord often disappear completely during a contraction and reappear after its cessation. But if the pulsations *entirely* cease for fifteen minutes, one may justly decide that the fetus is dead, and that the case should be left to nature.

Prognosis.—The falling of the cord is only serious as

regards the fetus, whose death may result as a consequence in the course of a few minutes, especially in presentation of the vertex. The fetus perishes on account of the pressure on the umbilical stem arresting placental respiration. It is known that the placenta not only conveys the nutrition to the fetus, but that it serves also as a respiratory organ. Therefore, death results from the failure in the supply of oxygen to the blood; that is, from asphyxia as a consequence of the interruption of the umbilical circulation.

The prognosis is more favorable if the bag of waters does not rupture before the head has descended deeply into the excavation, and also if the position of the prolapsed cord be in front of one of the sacro-iliac synchondroses, and if there be a period of rapid expulsion. Especially in multiparæ all these circumstances are favorable.

Treatment.—The treatment of falling of the cord requires great circumspection. Sometimes a prompt and resolute intervention alone gives some chance to save the life of the child; at other times a more expectant course is to be preferred.

If the *presentation* be discovered early, the rupture of the membranes should be retarded as long as possible. The parturient should be placed on her back with the hips somewhat elevated, quietude be enjoined, and no expulsive efforts be encouraged. Frequent touches should be avoided. The dilatation is very slow in these cases. It occasionally happens when the contractions become stronger, and the head fits more accurately the lower zone of the uterus, that the cord spontaneously withdraws itself. The later the amniotic sac ruptures the quicker will the expulsion of the child take

place. To prevent a premature rupture Bierbaum advises placing carefully in the vagina a colpeurynter or a large soft sponge made aseptic by boiling; the largest-sized Barnes bag would answer the purpose very well.

The *postural treatment*, advised first by Ritger and adopted by Thomas of New York, and before him by Prof. T. L. Papin of St. Louis, consists in placing the parturient on her knees and chest while the cord is still in the unruptured membranes, and keeping her in that position as long as possible: when she cannot endure it any longer, she is to be placed on the side opposite to that to which the prolapsed cord lies, in order to favor its spontaneous withdrawal; her hips should be elevated and her knees kept apart by pillows (Mead). However, it must be confessed that this manœuvre oftener fails than proves successful, although some rare successes are claimed by its advocates. Dr. Papin reported 16 successes by this method.

After the rupture of the membranes, when the prolapsus is more or less complete, manual or instrumental reposition should be attempted. In a presentation of the vertex or of the face, when these parts have not yet engaged in the excavation, we should first endeavor to reduce the cord by the manual method—the oldest method of all, and one which is still entitled to preference, notwithstanding the great number of instruments that have been proposed to supplant it. The right hand is to be used when the cord is to the mother's left, and the left hand if the cord is to the right. The loops are to be gathered up and pressed back, little by little, just as taxis is usually performed in the reduction of a hernia. The cord should be carried up above the superior strait, and retained there during several contractions to prevent

its falling again. The instrumental reposition should be attempted where the smallness of the external parts or an undilated os uteri renders the introduction of the hand very difficult or impracticable.

Various repositors have been devised, but Dudan's is the simplest and best. Dudan takes a large English gum-elastic catheter (No. 14 or 15 American scale), made aseptic. It should be armed with its stylet. A piece of narrow tape is introduced in the eye of the catheter and retained there by the extremity of the stylet. The tape is next attached to the umbilical cord without drawing it *too tight*. The extremity of the catheter carrying the cord is placed by the hand within the uterine cavity, the stylet is withdrawn, and the instrument is left in until the head becomes engaged. If the parts are deeply engaged, a surer and quicker method is the application of the forceps.

If the presenting part remains high and the os be dilated, version should be performed, preferably in the knee-chest position, as recommended by Ritger.

Statistics.—The statistics of the Vienna Lying-in Hospital show that 70 per cent. of the children were saved by the employment of forceps or version, while only 47 per cent. were born alive when other methods were used.

CHAPTER II.

DIFFICULTIES IN LABOR DUE TO SOME ABNORMALITY OF THE FETUS.

Hydrocephalus.—This dropsy of the head is usually a serous effusion confined to the cerebral ventricles, and sometimes creates great difficulty in labor. Hydrocephalus occasionally constitutes an insurmountable obstacle to parturition. When the effusion is smaller, delivery may still be possible, owing to the flexibility and the softness of the head, the walls of which are nearly membranous; so that by gradually moulding itself to the passage the head becomes lengthened out, and the labor is either terminated by the powers of nature alone, or is effected without much difficulty by the application of the forceps or by podalic version. When, on the contrary, the effused water exists in great abundance, the dimensions of the head (Fig. 56) so much exceed those of the diameters of the pelvis that delivery is absolutely impossible, unless the fluid be evacuated by an artificial puncture or by a spontaneous rupture of the sutures or fontanelles. In a case reported by Weisberg the child's head was $10\frac{1}{2}$ inches long and 36 inches in circumference. Meckel and Burns record similar cases.

Diagnosis.—The following, according to Dugès, are the signs whereby a dropsy of the head may be recognized during parturition: The finger falls upon a large and slightly convex surface, which covers every part of the superior strait without engaging, and which has a variable consistence at different points; for, although hard and resistant while the pain lasts, it is, on the

contrary, soft and fluctuating in some places during the intervals between the contractions. By passing the index finger slowly over this surface the accoucheur can rec-

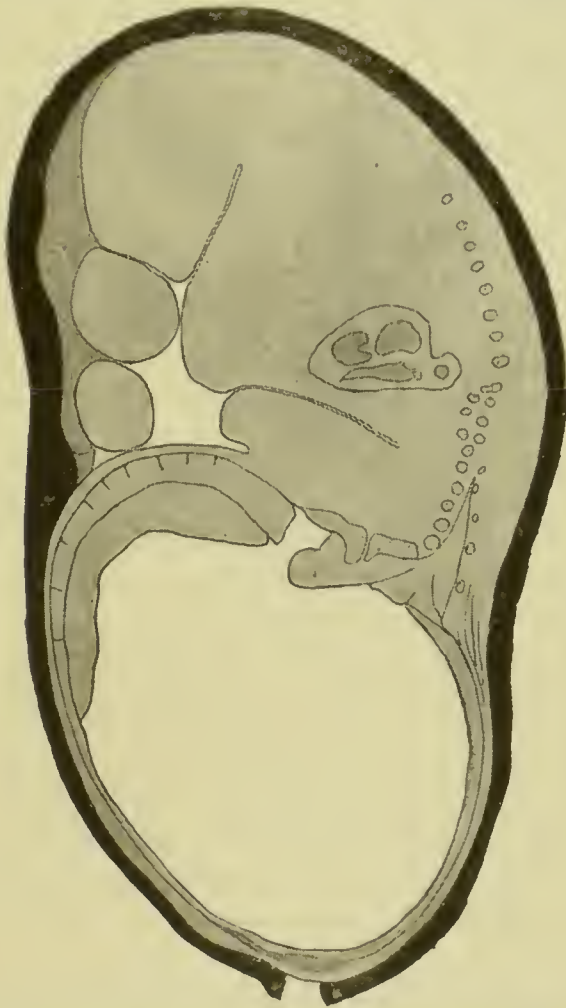


FIG. 56.—Hydrocephalus distending lower uterine segment (Varnier).

ognize pieces of bone separated by membranous interspaces or soft commissures as broad as the finger. At times the fontanelles are equal in extent to the hollow of the hand. If the child has presented by some part other than the vertex, and the head is only accessible to the

touch at its base, the separation of the bones detected by the finger will be much less, although often easily appreciable. Finally, if the dropsy be inconsiderable, the same characters will be observed, though less evident; and besides, the head, being more convex and not so soft, will engage better in the pelvic excavation.

Cystic tumors, spina bifida (see p. 340), *encephalocèle*, or the *skull of a macerated fetus* may frequently be mistaken for hydrocephalus (Lusk). This affection is comparatively rare, being met with, according to Madame Lachapelle, 15 times in 43,545 deliveries. The writer saw only 3 cases in about 9000 labors. By a singular coincidence, two of the mothers were the wives of hotel-keepers: one of these two women, for whom the writer had been called in consultation, had been in labor seven days upon his arrival, when he punctured the cranial vault. The child had been dead several days. The woman made a protracted recovery.

Prognosis.—The prognosis is generally unfavorable to both mother and child. If the labor be too protracted, the mother may die from exhaustion or from rupture of the uterus, the latter accident being comparatively frequent in hydrocephalus. Prof. Walter B. Dorsett lately reported a case that was followed by rupture of the uterus, for which Cesarean section was successfully performed.

Treatment.—When the cranium is of moderate size, soft and reducible, and some progress has been made in the labor, we should temporize. In case of delay apply the forceps or have recourse to version. The latter operation will be that most commonly necessitated, as breech or trunk presentations are relatively common among hydrocephalic fetuses. Among 152 cases re-

corded by Scanzoni, 30, or 1 in 5, presented by some part other than the head.

When, on account of the size of the head, a spontaneous delivery is wholly impossible and the application of the forceps or podalic version is impracticable, there is no other recourse to save the mother than to puncture the cranial vault, which measure alone can afford an outlet to the serum accumulated within it. This operation may be performed with the trocar, the bistoury, or with any pointed knife, after taking the precaution to envelop its blade with tape, so as to leave only its point uncovered. But it would be much preferable to evacuate the liquid with an aspirator, as safer for the child, thus avoiding through the more gradual draining of the liquid the sudden collapse of its cranium. Cazeaux remarks that the puncture of the envelopes containing the serum is not necessarily fatal to the child, as it is known that some children have been completely cured by such punctures performed after birth. If the uterus ruptures, celiotomy should be promptly performed.

Caput Succedaneum.—This is a sero-sanguinolent scalp-tumor, generally developed over that point of the cranium which corresponds with the os uteri during labor (Fig. 57). This tumor does not exist when the child dies prior to or during the first stage of labor. The inferences which the medical jurist can draw from this fact in cases where it is desirable to fix the period of death of a new-born child are clearly obvious, says Cazeaux. There is a wrinkling of the scalp prior to the formation of this tumor, and, as its site depends upon the position of the presenting part, it is easy to determine by a single inspection in what position the child presents.

The tumor is generally situated on one of the parietal bones, but if the occiput presents posteriorly, the tumor will be found about the centre of the vertex, and frequently on the anterior fontanelle. If the face presents, the tumor is situated over the whole face, which is there-



FIG. 57.—Formation of caput succedaneum.

by sometimes greatly swollen and disfigured, the cheeks protruding beyond the nose. The swelling will disappear in eight or ten hours, but in cases of face presentation the child's head will be thrown back on its neck for a few days on account of the strained position of the neck. Notice should be given to the parents of this fact, in order to avoid blame; otherwise they will think the accoucheur has broken the child's neck. A cause of error in diagnosis through which the swollen face is mistaken for the breech may readily arise; but this mistake may be corrected by noting the absence of the coccyx and the anus.

Cephalhematoma.—This tumor has often been confounded with caput succedaneum. In the latter tumor

the hairy scalp is of a well-marked violet color, has an edematous consistency, and does not fluctuate; while the skin of the cephalhematoma is colorless, presents a well-marked fluctuation, and its base is limited by a prominent osseous border. The cephalhematoma is generally single (Fig. 58), but it may be double. We know of no adequate causes to explain this formation. The writer has met with several such cases, and the tumors have

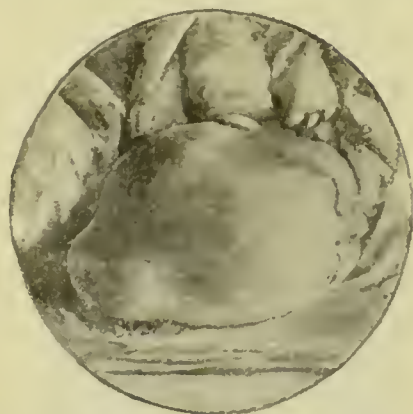


FIG. 58.—Cephalhematoma (Dickinson).

usually disappeared in from three to five weeks. Occasionally they suppurate, and should then be incised, but not otherwise, no remedy being needed except protection of the scalp with cotton batting to save it from injury.

The Caul.—When the membranes are very tough they resist the uterine contractions longer, and burst only when protruding from the vulva. Sometimes they do not rupture even then, and the head is expelled covered with the entire membranes (*caput galeatum*). This hood is called the “caul” by midwives, who say that the child will be lucky and “will not see ghosts.” In England this caul is dried and cut in small pieces, which are sold at a very high price as talismans of good luck.

There is danger of asphyxia for the child when born in the intact amniotic sac. The child, deprived of atmospheric air, will then be seen to struggle and to breathe water instead of air. Therefore the child should

be liberated from this membranous hood as quickly as possible.

Spina Bifida.—This anomaly arises from the failure of the vertebral arches to close over the dorsal aspect of the fetus, the bony rings which enclose the spinal canal thus remaining incomplete. When this arrest of



FIG. 59.—Large meningocele and spina bifida (Hirst and Piersol).

development exists at birth, a sac-like protrusion of the spinal membranes and cord takes place, constituting spina bifida. (See Fig. 59.) This abnormality may cause delay in labor.

The diagnosis of spina bifida is at times very difficult, as it may suggest a presentation of the face on account of the small size of the parts felt by the finger. Thus the orbits, the nose, or the mouth may erroneously be supposed to present, especially where a

hydrorachitic condition extends the whole length of the spine to the occiput. An extended examination should be made, and every projecting part of the presentation thoroughly scrutinized. The hip and the intercostal "gridiron" being recognized, the position, which is generally transversal, will be ascertained.

Treatment.—Turning by the feet, which is easily performed, should be resorted to, as the child is usually small, being premature. The complications of this anomaly may be a large hydrorachitic sac, an anencephalus, or an encephalocele.

Congenital encephalocele is rather a meningocele. It is an accumulation of cephalic fluid beneath the meninges, with or without investment of cerebral tissue, and may be due to arrest of development, the head being itself hydrocephalic or normal (Lusk). This abnormality very rarely obstructs delivery.

The prognosis is generally favorable for both mother and child.

Either the sero-sanguineous tumor on the head (*caput succedaneum*) or cephalhematoma may be mistaken for an encephalocele. This error can easily be corrected by considering that the former always appears during a hard labor, while the cephalhematoma shows itself only after the second or third day following delivery, and is characterized by a rough osseous border circumscribing a more or less soft tumor. In the writer's younger days he called in consultation the late Dr. Charles A. Pope to examine what the writer was sure was a *hernia* of the brain. Dr. Pope corrected the writer's mistake by making him feel that characteristic osseous border which is not to be felt in either a *caput succedaneum* or an encephalocele. Moreover, the latter is always congenital.

Hydrothorax and Ascites.—Ascites is rarer than hydrocephalus, but more frequent than hydrothorax. The extraordinary size of the child's abdomen, the distention of its walls, and the fluctuation detected there characterize ascites. The accoucheur can feel the excavation filled up by a large, soft, fluctuating tumor.

Treatment.—If properly directed tractions with the forceps are ineffectual, an evacuation of the fluid is the only recourse in hydrothorax, as well as in ascites. The same treatment will apply also to enormous distention of

the fetal bladder, as in cases which have been reported by Moreau and Depaul.

Emphysematous Condition of the Fetus.—Merriman has remarked that when the fetus has been dead for some time a large quantity of gas may be created in consequence of the putrefactive changes the fetus has undergone, thereby greatly augmenting the volume and the distention of the belly, and consequently retarding the expulsion.

Treatment.—A free puncture of the chest and of the abdomen with the knife or with an aspirator will soon relieve the distention and allow the labor to proceed normally.

Difficulties due to an Unusual Size of the Child.—Abnormal size and form of the child may render labor difficult, and sometimes even impossible, the conformation of the pelvis and the expellent forces being otherwise normal. But nature will often suffice for the delivery under this condition. The greatest difficulty will present when it becomes necessary to turn a very large child. In this case especial care should be taken to avoid the crossing of an arm to the back of the neck, and efforts should be made to turn the face, first toward one of the sides of the pelvis and then toward the sacrum, and also to depress the chin, so as to bring the occipito-bregmatic and biparietal diameters parallel with those of the pelvis. Such is the advice given by Dugès. Amplitude is not uniform throughout the whole body of the child. It is chiefly observed in the unusual size of the head and shoulders.

Unusual Size of the Head.—The conformation and degree of ossification of the fetal head may vary: there may be development of ossa Wormiana at the fontanelles,

causing their ossification and rendering the head less capable of moulding itself in its passage through a contracted pelvis. But, as Naegele pertinently remarks, "bones less ossified, and larger sutures and fontanelles than usual, are often found in voluminous heads, so that such heads are much more compressible during labor than smaller heads with very hard bones, narrow sutures, and small fontanelles." If unassisted nature be unequal to the task of delivering such large children, recourse should be had to version, the forceps, symphyseotomy, or the Cesarean operation, or to embryotomy if the child be dead.

Monstrosities.—According to Geoffroy St. Hilaire the principal monstrosities are as follows: *Acardia*, or absence of the heart: this is a very rare monstrosity, well described by Lusk, who had a remarkable case in his own practice; *acephalus*, where there is no head, is more common; *anencephalus*, or rather *hemiccephalus*, which is not so rare.

In the latter abnormality the fetus is often excessively large and the amniotic fluid very abundant. The head is to be found immediately above the trunk, with hardly any neck. The ears are on a level with the shoulders, the eyes are very prominent, and the tongue protrudes. The rudimentary cerebrum is covered with a hairy scalp. This monster generally presents by the base of the cranium or by the face, and occasionally by the feet or the trunk. The method of diagnosing this monstrosity is described in the chapter on *Abdominal Palpation*.

Diagnosis of Monstrosities.—When the head presents the diagnosis is difficult, on account of the deformity of the parts. If the finger endeavors to reach the presenting part, the irritation of the finger on the brain-

stump causes convulsions and violent disorderly movements of the child. By this sign Cazeaux and Dubois, as well as Walter B. Dorsett of St. Louis, were enabled to diagnose an anencephalous fetus. The specimen in the hands of Dorsett weighed $15\frac{1}{2}$ pounds. Its appearance is truly horrid, resembling that of a frog or a hideous toad. The pagan accoucheurs resorted to the barbarous custom of killing these monsters by strangulation: we, more humane, let them die. Their death takes place soon after birth. Of course the mother of such a child should not be permitted to see it. These monsters are generally delivered by the unassisted efforts of nature.

Monstrosity by inclusion is the term applied to the condition in which a rudimentary fetus is included in a larger one (as in Velpeau's case, mentioned below).

The prognosis is not grave for the mother, but is more or less unfavorable for the child according to the region of the fetal body occupied by this parasite. In some cases the included fetus is known to have lived several hours.

Double Monstrosities.—In this anomaly the fetuses may be united in different ways, as so well described by Playfair. He mentions, first, two distinct bodies united either anteriorly (Fig. 60), laterally, or posteriorly, as in the cases of the Siamese Twins and of Ritta-Christina (the remarkable fact has been observed that in this variety the twins are always of the same sex); secondly, two heads and a single body (Fig. 61); thirdly, one head with two bodies.

There are other varieties described by authors. The writer has in his collection a large fetus with one head, three arms, and two inferior extremities, and another

specimen with one head, having a supplementary ear, and two bodies. The latter, according to Foerster, is almost a unique monstrosity; its only analogue is to be found



FIG. 60.—Xiphopagus (Hirst).



FIG. 61.—Diprosopus (Fleming).

in the museum at Stuttgart. The two monsters just described were delivered by Dr. E. L. Feehan of St. Louis.

Treatment.—Unassisted nature, generally, will prove equal to the management of the delivery of these monsters by the process of spontaneous evolution. However, version, the forceps, or even the Cesarean operation or symphyseotomy, may occasionally be the proper measure to adopt. Success depends greatly on the skill of operator.

Tumors of various kinds may develop in different parts of the fetal trunk and obstruct parturition. They vary in their nature, and may be either cystic, fatty, or vascular, or may contain other constituents, sometimes even being dermoid. The latter variety, which may acquire the size of the head of a large child, is more frequently observed in the lumbo-sacral region. Dermoid

tumors are sometimes *parasitic*, and have been known to contain another fetus by *inclusion*. Velpeau, in a magnificent lecture, delivered in Paris some years ago, on tumors, exhibited to an assembly of eminent Frenchmen and foreigners an unusual tumor situated in the scrotum of a young boy. After asking the opinion of the assembled *savants*, who proved to be unable to

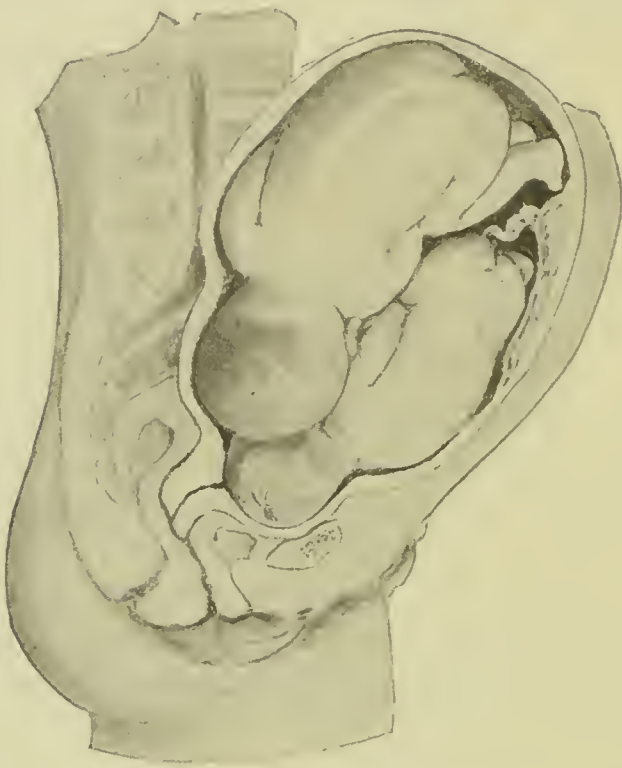


FIG. 62.—Twins, both heads presenting (Dickinson).

make a positive diagnosis, Velpeau, who had applied his method of diagnosis by exclusion, exclaimed: "Gentlemen, this boy is carrying his brother in his scrotum;" and in their presence, making a free incision in the tumor, he extracted several small bones and some hair. The

enthusiastic assembly pronounced this a masterly effort of diagnosis, which it really was.

Locked Twins.—With two heads presenting the head of the second child may place itself as a wedge on the neck of the first (Fig. 62), or the trunk of the second child may be arrested in the excavation (Chailly). Delivery is then impossible unless assisted. If the heads are small, no intervention is necessary: one head may be pushed out of the way. If the heads are large, version or the forceps may be resorted to, and if not successful the Cesarean operation or symphysectomy should be performed for the living child. If dead, decapitation or embryotomy becomes urgent.



FIG. 63.—Impaction of heads in twin labor (Dickinson).

There may arise other complications mentioned by authors; for instance, the occiput of one child may wedge itself on the neck of the other (see Fig. 63); the first child may present by the head, the second by the breech, or *vice versa* (see Fig. 64); one child by the

vertex, the other by the trunk. There are other varieties, the diagnoses of which have generally been made only at the time of labor. It is difficult to fix precise

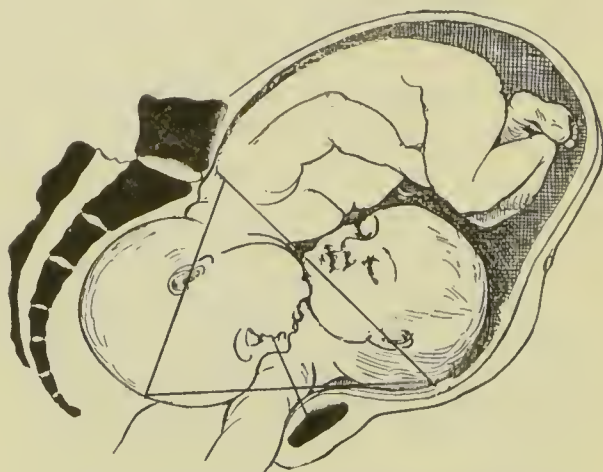


FIG. 64.—Locking of heads in twin labor (Dickinson).

rules for the management of these cases, which are far from being uncommon: it will be left to the choice of the obstetrician to adopt any of the methods of treatment hinted at above.

CHAPTER III.

OBSTETRIC FRACTURES.

OBSTETRIC fractures may happen in the practice of the best obstetricians.

Fractures of the humerus, which are the commonest, take place most frequently in the disengagement of the arms, after podalic version, or in breech presentation, and also when the child is of unusual size.

Fractures of the clavicles are sometimes "green-stick" fractures, and at other times complete. They are caused, says McClintock, by pressing directly with one or two fingers in the endeavor to bring the head through the pelvic inlet in podalic version or in breech presentation. However, this fracture may be produced by energetic uterine contractions alone when the shoulders of a large child are passing through a moderately contracted pelvis.

Depression and Fracture of the Cranial Bones.—The depression of the cranial bones may be very considerable, and yet not be followed by any serious consequences. But if this depression is accompanied with convulsions and paralysis, the scalp should be incised and the depressed bone be raised. Fractures of the cranium and contusions of the face due to the forceps may be followed by hemorrhage into the brain.

Injuries of the sterno-cleido-mastoid muscle and torticollis may be caused by improper applications of the forceps, pushed in too far, but these injuries happen most frequently in head-last cases, and they may be accompanied with hematoma or some inflammatory tumor.

Fracture of the Thigh-bones.—This rare accident may take place spontaneously or be produced by artificial delivery. Dr. Van der Veer reported a case of spontaneous fracture of the thigh in childbirth; Meyer reported two cases; but "most probably," says Parvin, "the fractures of the femur are caused by the attempts to pull down a lower limb in pelvic presentation, when the presenting part is already partially in the mother's pelvis, before pushing up the presenting part; or from the use of the blunt-hook." In such cases of impaction of the breech, instead of using the dangerous blunt-

hook the forceps should be applied to the breech, in accordance with the technique presented in the chapter on *The Forceps*. This use of the instrument is upheld by Lusk, Miles, and Tarnier.

Treatment of Fractures.—Fractures of the humerus should be treated by a starch or a crinoline bandage; they will unite in eight or ten days. The fractures of the clavicle should have the same treatment as that used for the adult. Fractures of the thigh-bones should be managed by applying a small Hodgen splint or by improvising a Mayor suspensory apparatus. Delore recommends placing the member at a right angle to the body and surrounding it with a silicate bandage.

It should again be mentioned that any obstetric fracture may take place spontaneously in normal labor with a contracted pelvis and a large child. The parents should be informed of this fact in order to shield the obstetrician.

CHAPTER IV.

APPARENT DEATH OF THE NEW-BORN (ASPHYXIA NEONATORUM), AND UMBILICAL HEMORRHAGE.

Asphyxia Neonatorum.—*Two forms of this condition* are to be observed—the apoplectic form and the anemic, called by the old writers the *livida* and the *pallida*, and presenting very different aspects. In the first there is a purplish or a bluish discoloration of the skin, a prominence and injection of the eyeballs, and a swollen state

of the face and lips ; the pulsations of the heart are generally strong and the cord is distended with blood. In the second form the child presents a mortal pallor, the limbs are pendant and flabby, the lips are pale, and the lower jaw hangs down. There is an almost complete cessation of the heart's action, or asystole.

The diverse appearances in these two forms are due to the operation of the same cause. The same differences of appearance have been observed by M. Duvergie, an eminent medico-legal authority, in the asphyxia of adults. He noticed that when persons are buried by an embankment of earth falling upon them, they present, on being extricated, the above-noted discolorations of the integument. When the asphyxia has lasted but a short time prior to their being removed, they will exhibit turgescence of the face, a violet hue of the skin, and frequent and regular pulsations of the heart. If a longer period has elapsed since the interruption of the respiration, they will be pale and colorless, and the pulsations of the heart will be feeble or extinct. Finally, if the asphyxia has lasted still longer, they will really be dead at the time of removal. The two conditions above described, and apparently so different, are due to the same cause, and are simply two degrees of asphyxia.

The condition of the asphyxiated fetus is identical with that just described as existing in the adult, and the varied appearances represent simply two degrees of asphyxia, the recognition of which greatly influences the prognosis and treatment.

All physiologists agree with Marshall Hall that the centre and regulator of the respiratory movements is in the medulla oblongata. From it also is sent the motor impulse which gives rise to the first act of respiration.

The activity of this centre is believed to be augmented by a condition of venosity of the blood. Therefore, all interruptions to placental respiration—for instance, the premature detachment of that organ or the compression of the cord, and all obstacles to the introduction of air into the trachea, such as mucus or blood, will be attended with violent motor impulses: first, efforts to breathe, and later convulsive movements preceding death. Béclard saw a fetus, enclosed in the unruptured membranes, make inspiratory movements and breathe water instead of air. This interference with the placental circulation explains those reported cases of *vagitus uterinus* after the rupture of the membranes, when the child, presenting by the face, has been heard to cry aloud while yet in the womb, a certain amount of air finding access to its face.

Causes.—The causes of uterine asphyxia are compression of the cord in a natural way during operations; forced rotation of the head in difficult forceps applications; the premature detachment of the placenta; great retraction of the uterus in head-last cases, thus rendering the vessels of the uterus impermeable to blood and suspending the placental respiration.

Asphyxia of the child may be caused by an extreme shortness of the cord or from its encircling the neck tightly after the head is born. The child's face then becomes turgid and blue, and the child will certainly die unless promptly rescued. With a pair of scissors the cord should be cut above the child's head, and the body be delivered as quickly as possible, even at the risk of fracturing a humerus. This measure may also become necessary in those head-last cases when the arms have been carried above the head by ill-timed tractions on the feet,

or when the mother is in imminent danger from eclampsia, suffocative asthma, or pulmonary emphysema. The necessity for this action should be explained to the parents in order to protect the physician from the possibility of a suit for malpractice.

Treatment.—If the child at the moment of birth is apoplectic and presents a dark-blue coloration, its cord pulsating strongly, the first measure to be taken is to cut the cord and let it bleed to the amount of about two tablespoonfuls. To obtain enough blood from the cord a series of cuts should be made close together, beginning at a point 12 inches from the navel and gradually approximating it. The cord should be squeezed and placed in warm (not hot) water to favor bleeding. If, on the other hand, the child is born pale, cold, and anemic, the cord should not be cut until all pulsations in it have ceased. Then, without losing any time, one should blow into the mouth of the child in order to expel mucus and blood from its nostrils, which are to be kept open.

If necessary, make mouth-to-mouth suction, or suction may be made through a soft catheter placed in the larynx; the larynx may also be wiped out with the moistened end of a feather taken from the wing of a chicken. (A feather should always be kept in the obstetric bag, as in an emergency there may not be time to obtain one.) If these means do not succeed, adopt the invaluable method suggested by Dr. Harvie Dew of New York—a method which is here presented almost in his own words:

Dew's Method.—"I grasp the infant with the left hand, allowing the neck to rest between the thumb and forefinger, the head falling over, bringing the mouth into line

with the larynx and trachea, thereby raising and holding open the epiglottis. The upper portion of the back and scapulæ rest in the palm of the hand ; the other three fingers are to be inserted in the baby's left axilla, raising the arm upward and outward. I then grasp the knee and depress the pelvis and lower extremities, so as to allow the abdominal organs to drag the diaphragm downward, and with the left hand gently bend the dorsal region of the spine backward (*opisthotonos*). This enlarges the thoracic cavity and produces inspiration, of which you will be informed by a gurgling noise. Then, to excite expiration, reverse the movement, bringing the head, shoulders, and chest forward, closing the ribs upon each other, and at the same moment bring forward the thighs, resting them upon the abdomen. This movement arches the lumbar region backward, and so bends the child upon itself (*emprosthotonos*) as to crowd together the contents of the thoracic and abdominal cavities, resulting in a most complete and forcible expiration. Whilst this movement is a powerful one, the operator can by his manipulations accomplish it without shock and render it as gentle as he pleases."

The nearest approach to this method is that suggested in 1870 by Dr. H. L. Byrd of Baltimore. But the superiority of the Dew method is that it permits one to manipulate the child under warm water, the heat of which is a powerful restorative and stimulant to the child's heart. For years the writer taught and practised Dr. Byrd's suggestion under the name of the "Baltimore" method, but now would in preference recommend the Dew method as an improvement on the Byrd method, which it completes. This operation should be repeated

about twelve times in a minute, and be continued for ten minutes ; then, if not successful in producing respiration, swing the child forward a few times, gently spank it, titillate the soles of its feet, and place it in a bath of very warm water, and, without waiting many minutes, begin artificial respiration from mouth to mouth, closing with the free hand the nostrils and esophagus.

The above and following methods borrow much of their value from the instructions given by Marshall Hall and Sylvester, which they intended should be applied chiefly to the restoration of adults rescued from a "watery grave." Their methods are not, however, to be relied upon in the case of asphyxiated infants.

HOW TO PRODUCE ARTIFICIAL RESPIRATION.—The child's neck and shoulders should be placed on a small hard pillow, the head falling back ; this position will straighten the line of the trachea and glottis. Then, after a complete expiration, the operator fills his mouth with a good supply of air which he has not breathed, and slowly blows this mouthful of pure air into the larynx of the child, and compresses its thorax to expel the air after each insufflation, repeating the procedure ten times a minute. The fear of rupturing air-vesicles or producing traumatic pulmonary emphysema is groundless, as proved by reliable experiments. If some air should enter the stomach, gently press it out. If there is at hand a Chaussier, a Depaul, or a Ribemont laryngeal tube, use it in the following manner :

Depaul's Method.—The child, whose temperature should be maintained by warm coverings, should be placed with the breast higher than the pelvis and the head thrown a little back, so as to cause the front of the neck to project somewhat. This procedure will

straighten the line of the fauces and trachea. Having cleansed the tongue and pharynx from mucus, the forefinger of the left hand should be passed along the median line of the tongue to the epiglottis. The right hand holds the laryngeal tube like a pen, and directs its small extremity along the left forefinger into the opening of the larynx, inclines it toward the left commissure of the lips, and by gentle movements endeavors to raise the epiglottis; it is then only necessary to elevate the instrument, carrying it at the same time toward the median line, for its extremity to pass through the glottis. This is the only part of the operation that presents any difficulty, as it is not uncommon for the tube to enter the esophagus. Before resorting to insufflation we should make sure of the situation of the tube by passing the finger along the larynx and trachea, and by observing whether the larynx follows the instrument when the latter is moved from side to side. However, the first insufflation immediately reveals the error, for when the instrument has passed into the esophagus a considerable elevation of the epigastrium precedes that of the base of the chest; if, on the contrary, it is in the larynx, the chest is dilated uniformly, and the epigastric projection is produced exclusively by the depression of the diaphragm.

To prevent reflux of the air, and to oblige it to enter the air-passages, every point of exit by the esophagus, mouth, and nostrils should be closed. The anterior wall of the esophagus is applied against the posterior wall, by a moderate pressure backward with the instrument. The lips are pressed closely to the sides of the cannula by means of the thumb and forefinger, while the nostrils are stopped by pinching the nose between the middle and

ring fingers. The insufflations should follow each other closely. Prof. Depaul thinks that from ten to twelve should be made in a minute. The greater part of the air is expelled after each insufflation by the elasticity of the chest-wall; it may be useful, however, especially at the beginning, to render the expiration more complete by properly-applied pressure with the whole hand on the front of the chest.

The length of time during which it is necessary to continue the insufflations varies. Thus, there are facts showing that sometimes a quarter of an hour has been sufficient, while at other times it was necessary to continue them for three-quarters of an hour, and even an hour and a half, when, under their influence, the action of the heart was so far restored as to be at from 100 to 130 beats a minute. "I think," says Prof. Depaul, "that the physician should continue until spontaneous inspirations appear and are repeated at the rate of at least five or six per minute, since to stop after the first one would in many cases endanger the life of the child. When, however, after having awakened the pulsations of the heart, and even obtained some efforts at inspiration, all becomes more feeble and disappears, the insufflation may be abandoned after the lapse of from ten to twelve minutes, for under these circumstances I have never known a child to be saved."

Cazeaux remarks that long-continued silence of the heart and the entire absence of pulsations at the precordial region, frequently determined at intervals, is the only sign which can be regarded as destructive of all hope. The heart is the *ultimum moriens*, as it is the *primum vivens*.

Schultze's Method.—This method, much in vogue

among the Germans, may be described in a few words. It should be performed by so grasping the infant that the operator's thumbs shall rest, on either side, upon the anterior thoracic wall, while the index fingers occupy the axillæ and the remaining fingers are placed diagonally across the back. (See Fig. 65). The child is then allowed



FIG. 65.—Schultze's method of artificial respiration: inspiration.

to hang at arms' length between the knees of the obstetrician, its face being turned to the front. The child is next swung upward until the arms of the operator reach an almost horizontal position. These two move-

ments induce inspiration. The child's position is then inverted without changing the position of the operator's fingers, so that its head is now directed downward, and its lower extremities fall slowly toward the obstetrician until the whole weight of its body rests upon his thumbs. (See Fig. 66.) This movement induces expiration.



FIG. 66.—Schultze's method of artificial respiration: expiration.

The Schultze method produces, indeed, inspiration and expiration, but, as pointed out by Prof. Lusk, the action is too violent and cannot be regulated with gentleness. Prof. Lusk adds that the objection to the

Schultze method is, that if the heart's action is very feeble and the swinging movements are repeated, in a brief period of time the heart will cease to beat altogether and life will become extinct. Schultze's method so chills the child that if the heart be weak it dies from loss of heat before artificial respiration gets a fair chance.

Method of Devrees.—This sagacious American obstetrician had many years ago partially anticipated the Schultze method. His plan was to grasp the feet of the child, turn its head downward, and give it a few shakes, as one might do in emptying a sack: this would expel blood and mucus from the mouth; then, swinging it two or three times in the air, he plunged it in very warm water and subjected it immediately to aspersion of cold water on the pit of the stomach. These

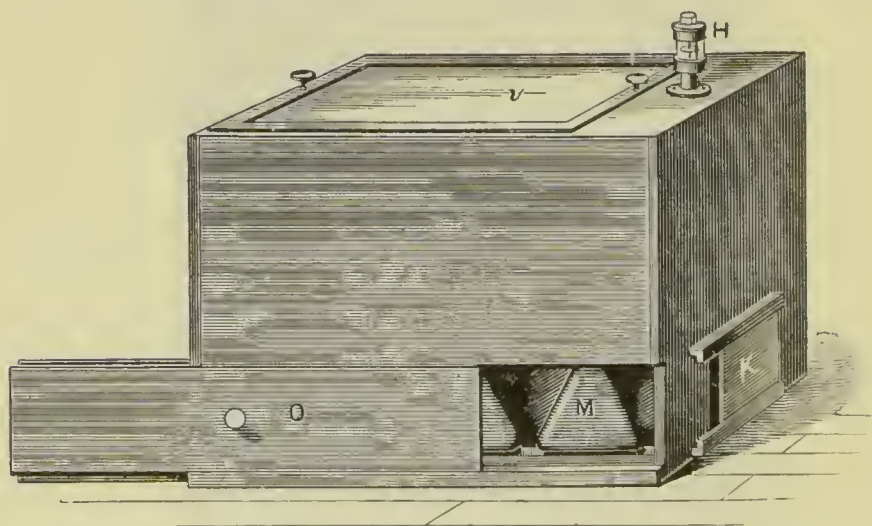


FIG. 67.—Modified Auvard incubator: *v*, glass plate of the movable lid; *H*, ventilation tube containing small rotary fan; *K*, ventilating slide; *M*, hot-water cans; *O*, slide closing hot-air chamber.

measures were to be continued for a long time after respiration had been established, in order to prevent secondary asphyxia. "By observing these measures I am

every way persuaded," says Dewees, "that I have preserved the lives of many children."

Should the child have been born before full term and be pale, weak, and anemic, the above measures for preserving its vitality are to be carried on with still greater attention and perseverance. After respiration has been established and the child is separated from its mother, in order to avoid fatigue it should not be dressed, but be wrapped in warm roll-cotton (preferably to cotton bathing), warm-water bottles covered with flannel should be placed along its side and at its feet, and, still better, it should be placed in a Tarnier, a Credé, or an Auvard *couveuse* (Figs. 67, 68). The *couveuse* is a sort of hatching-box or incubator which any one with some in-

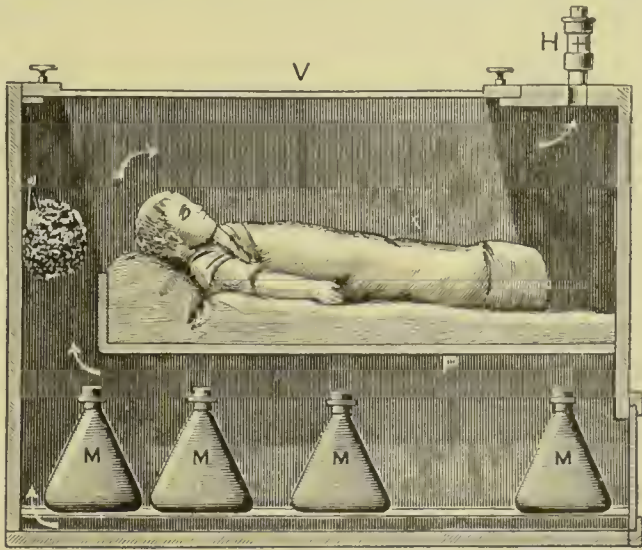


FIG. 63.—Interior view of modified Auvard incubator.

genuity can improvise. The child should have the benefit of these heat-saving contrivances until it has attained the ordinary natal period. Tarnier reports a number of children born at seven, and even at six and a half months, who were saved by the use of his *couveuse*.

As an infant born under these circumstances is too feeble to take the breast, it should be fed with a medicine-dropper, or a few drops of the nurse's milk should be instilled very often into its mouth; but when it is strong enough to take the breast a good wet-nurse having a small nipple should be secured. It is important to give the infant only the first milk, which, being lighter, is of easier digestion. By these means very weak infants have been saved. Such children are weak and small indeed, but have great possibilities, and by saving their lives the obstetrician secures the everlasting gratitude of the parents.

Whenever a child born of Christian parents is in a state of apparent death or of extreme weakness from any cause, it is the duty of the obstetrician to see that the rite of baptism be immediately administered. For, whatever the religious opinions of the physician may be, it is his duty to respect the feelings of the family, and he would truly be blamable were he not to yield in this respect to the wishes of the parents, especially should he be practising in Catholic, Lutheran, or Episcopalian families, who consider infant baptism of the utmost importance.

Summary.—1. If the child be born blue and apoplectic, the first thing to do is to cut and bleed the cord. If the child be born pale and anemic, do not cut the cord until it has ceased to pulsate.

2. Blow into the mouth of the child to expel blood and mucus through its nostrils, which are to be kept open; make mouth-to-mouth suction or use a soft feather to draw mucus or blood from the larynx.

3. Practise the Dew method; put the child in very warm water, alternating with short and quick affusions

of cold water; or use the Dewees method or that of Schultze, the latter for a few minutes only.

4. If not successful, begin at once artificial respiration from mouth to mouth or with a laryngeal tube. Persevere, if necessary, for an hour and a half.

5. If the child be in great danger of death, have baptism administered.

Umbilical Hemorrhage.—Bouchut relates a case in which death, took place during a forceps application from laceration of the navel on account of a short cord. Usually, however, the hemorrhage begins immediately after birth and even after a proper ligature has been applied, or it takes place within a few days after birth, and in the latter instance generally from the root of the cord. Notwithstanding the best treatment, death occurs in five out of six of these cases. Hemophilia may be hereditary; it is sometimes due to syphilis, and often is accompanied with jaundice.

Treatment.—Try perchlorid of iron or stuff the parts with plaster of Paris. Bouchut states that the only effectual treatment consists in passing two needles through the umbilicus at right angles, and around each a waxed thread should be wound in the form of a figure 8. The needles are to be removed in four or five days and a sterilized gauze bandage applied.

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